ICD08635

POPULAR COMMUNICATIONS

SEPTEMBER 1994

Mysteries of the UHF Military Band

Also in this issue:

- **We Review: The AOR 3030 Receiver**
- **Scanner Soup-Up Stunts**
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> *Staff review*
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This month's cover: *Air Force Security Police Officer Fredrick Morris is one of many servicemen using military communications. Officer Morris stands guard accompanied by a C-130 aircraft at Wright Patterson AFB, in Dayton, Ohio. Photo by Larry Mulvehill, WB2ZPI.*

EDITORIAL STAFF

Tom Kneitel, K2AES/KNY2AB, Editor
Deena Marie Amato, Associate Editor

CONTRIBUTING EDITORS

Gerry L. Dexter, Shortwave Broadcast
Gordon West, WB6NOA, Emergency
Don Schimmel, Utility Communications
Edward Teach, Alternative Radio
Harold A. Ort, Jr., SWL Conference Coord.
Chuck Gysi, N2DUP, Scanners
Roger Sterckx, AM/FM Broadcasts
Harry Helms, AA6FW, Thoughts and Ideas
Donald Dickerson, N9CUE, Satellites
Kirk Kleinschmidt, NT0Z, Amateur Radio
Joe Carr, K4IPV, Antennas
Ted Lisle, KD4EXK, Handi-Chat Editor

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Pat Le Blanc, Phototypographer
Hal Keith, Technical Illustrator
Larry Mulvehill, WB2ZPI, Photographer

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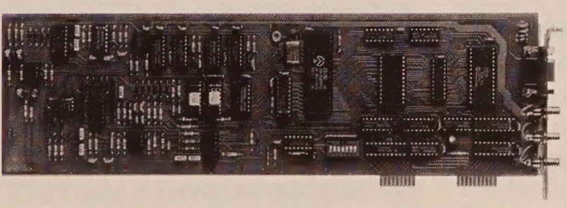

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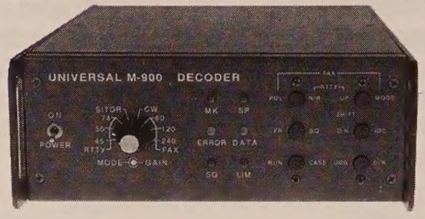

Here is a compact, easy-to-use decoder that copies the most important shortwave transmission modes: **Morse** code for monitoring hams, ships and coastal stations. **Baudot** radio-teletype is included for decoding weather and international press. Both **SITOR A & B** are supported for monitoring the extensive maritime and diplomatic traffic. The new **FEC-A** European press mode has also been added. **FAX** mode lets you receive maps and pictures from around the world. The Universal M-900 requires a composite video monitor. Now includes 12VDC P.S. Made in USA. **$489.95** (+shipping)

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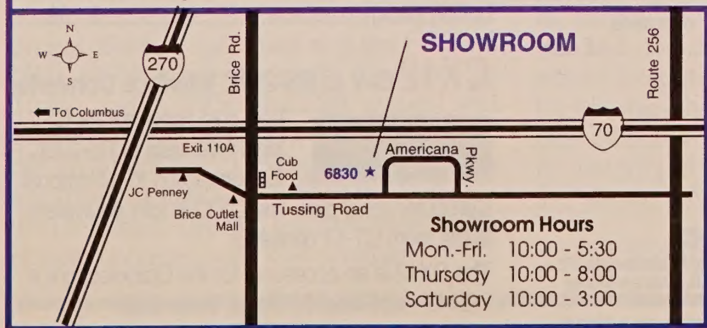

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BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

Odds & Ends

The word is that the US Navy will no longer tolerate suggestive personal radio callsigns for its Top Gun fighter pilots. "*Merry Sunshine* to *Bluebird*, bandits at angels two zero."

The Pentagon desalinating sailors' lingo? What will they think up next?

* * *

One of the first things I turn to in *TV Guide* each week is the regular featurette describing the favorite TV programs watched by influential celebrities and stars.

Astounding how many of these folks tell *TV Guide* that most of their viewing is directed at CNN, PBS, C-SPAN, *Meet The Press*, and similar brain-food programming. Almost nobody powerful, important, or famous ever says they watch the likes of Dave Letterman, *Ren and Stimpy*, *Seinfeld*, *Home Improvement*, *The Simpsons*, or sports.

Only two celebs are recalled as varying from this pattern. One was Tammy Faye (late of the *PTL Club*). Said she spent a lot of time watching home shopping channels, and *I Love Lucy* reruns. Another was fashion designer Diane Von Furstenberg, who frankly admitted she watched *Saturday Night Live* and *Beavis and Butt-Head*.

After analyzing several years' worth of celebrity TV-viewing data, I have discovered the closely-guarded secret of achieving fame and success. Watch only boring intellectual programs on TV! Don't watch *MTV* and pop shows. Consider the possibilities that those wonderful intellect-eating pop shows might be put on the air by the powerful famous people as a diversion. This chewing-gum for the mind serves only to prevent us average folks from watching the worthwhile TV programs and channels that would create any more celebrities such as themselves. Very clever way of keeping their "club" exclusive.

Of course, there's a slim chance that pretentious celebrities fudge the truth about their true viewing favorites when asked. Is that possible? *Nah!*

Speaking of TV, I got to thinking that color TV has been around for about 40 years now. It didn't happen easily, what with RCA and CBS each proposing their own proprietary color systems for FCC approval. Both systems had met the FCC's 6 MHz TV-channel bandwidth standards by 1949, and in 1950 the CBS system was given FCC approval. In late 1953, the FCC did an about-face by cancelling the CBS approval, giving the modified RCA system the go-ahead. The two companies were decidedly unhappy with one another.

Worse than that, TV receiver manufacturers were not interested in bringing out sets because the public was confused. There wasn't any color TV programming, anyway. Besides, color TV sets would cost more than $1,000 each, amounting to a month of decent wages in those days. People watched their black/white TV sets. anxiously awaiting the arrival of color programming and affordable color receivers.

Things eventually did sort themselves out, but color TV did begin in a series of fits and starts. It took years to work towards and arrive at the apex of this technology when all new TV programs were being aired in color. The next technological quest is High Definition Television (HDTV).

How odd, therefore, to see that TV has now moved ahead to the point where the industry has reinvented the black/white TV technology discarded decades ago. It's the latest trendy gimmick in TV commercials. One of those things that one company does, which is then copied by dozens of others who think it must be cool. Soon enough, half the TV commercials seem to be in black/white. In one evening of viewing, I logged fully or partially black/white TV commercials for Volvo, Amoco, Buick, Calvin Klein's Eternity and Obsession, Crest, Acura Legend, Noxzema, AT&T, and Northwest Airlines. Those, plus the pseudo-black/white TV irritating epics hawking Infiniti cars. Enough already! Won't someone please go out and find that dumb looking color TV peacock again?

Have you noticed how many of the music videos on *MTV* are in black/white now? Just wait until the people who come up with the concepts for the weekly sitcoms also discover this retrograde step in broadcast technology! You know how original TV is. Sometimes I wonder if there have been more than two dozen truly original TV ideas since the days of Uncle Miltie. One sitcom will do it, and by mid-season we will all be dragging our old black/white TV sets out of hall closets and garages to put them back in service.

Here's the irony. Ted Turner, of TBS and TNT, tried to reverse the trend by colorizing old black and white movies he had purchased for showing on TV. This caused an outcry from the movie industry, which claimed coloriziation was destroying the artistic integrity of the films. Oddly enough, for 45 years those same people never complained about TV's destruction of the artistic integrity of their films, despite their being shown with commercial interruptions

(Continued on page 81)

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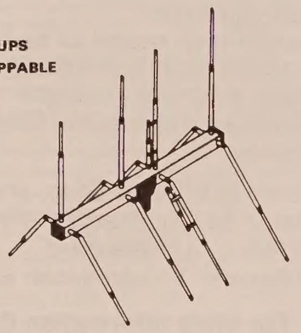

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CIRCLE 53 ON READER SERVICE CARD

MAILBAG

LETTERS TO THE EDITOR

Each month we select representative reader letters for our Mailbag column. We reserve the right to condense lengthy letters for space reasons. All letters submitted must be signed and show a return address. Upon request, we will withhold sender's name should the letter be used in Mailbag. Address letters to Tom Kneitel, Editor, Popular Communications Magazine, 76 N. Broadway, Hicksville NY 11801.

Fried Ham

Your May editorial "One For The Books," about Chris Boyer's ham handheld transceiver being taken away from him by the FCC at the behest of the San Diego Sheriff's Dept., disturbed me no end. This is so typical of the bureaucratic attitude. As one who has been fortunate to have been involved with emergency occupations (police, fire, first aid, emergency management), I have worked with many outstanding individuals. I have also worked with the occasional individual who uses no common sense and wants to appear a big shot.

As a certified part-time police officer, I have had authority to use the national police emergency frequency (155.475 MHz). The type of incident you described could have happened to me. I often wondered if I would have had the courage to take action Chris took had I been in an area or state other than my own, then used my portable to call for assistance. I suggest that all who react negatively to the subject in your editorial, make a copy (since you presented the scenario so well), and send the copy to his/her Senator and Congressional Repsentative. This type of antisocial behavior should not be ignored.

Prof. Thomas F. Goulart,
Plymouth, N.H.

Political squabbles taking priority to life and safety? Looks that way in San Diego, according to your May *Beaming In*. Given the validity of the story's details, Chris Boyer is a hero. I doubt that I would have handled the incident any differently. FCC Section 97.403 is crystal clear on this. Perhaps Mr. Kahn of the San Diego Sheriff's Dept. should read it. In my years of involvement in public safety communications here in Baltimore County, I can't say I have ever seen such a situation arise. Had it taken place, I hope I would've handled it with the victim's best interest in mind, at least as long as I had anything to say about it. I can't imagine what the FCC's San Diego office had in mind with their reported action and disapproving comments. I can only assume that the matter will be resolved equitably upon further investigation.

Alan Dixon, EMT, N3HOE
Member Emeritus:
Communications Committee,
Baltimore Co. VFA,
Member Emeritus: 911 Task Force,
Baltimore Co. VFA,
Baltimore, Md.

While your May editorial on Chris Boyer brings to light how hobbyists can come to the aid of those in need, it likewise demonstrates how we can also get in trouble by putting ourselves in a dubious position. I agree that Mr. Boyer is a hero, and that I would have done the same thing had I been in his situation. Yet I have to wonder why he was walking around with a modified radio in the first place. Using that justification, we could all justifiably modify our radios and butt in on public safety channels whenever we felt there was an "emergency." Though Chris made a sound decision in that particular situation, the fact that he had the capability to transmit on the unauthorized frequency implies that there's a possibility that he shouldn't have done so. *POP'COMM* rightfully came to Chris Boyer's defense, but it is a strange irony that on page 72 of the same issue Gordon West writes, "Never, not even in an an emergency, would an operator send a message over a...channel not specifically assigned to them for this use." It seems that we are giving ourselves mixed messages. I'll say this much, if I ever take a spill in a remote area with no ham repeater coverage, I hope there's someone around with an unauthorized police radio. I love your magazine.

Charles Warfield, Jr., KA9OFN,
Naperville, Ill.

Gordon West is a seasoned communications professional, as well as a licensed ham. These are reasons why Gordon is a POP'COMM columnist. My editorials reflect only my own personal opinions. Our columnists are free to offer perspectives of their own that don't necessarily match mine. I see no conflict in providing readers with more than one facet of complex situations. The FCC, itself, doesn't appear to be clear on its position regarding this particular situation, and has sent out mixed signals that conflict with its rules. —Editor. ■

Last chance to buy Cellular Modifiable Scanners

COMMUNICATIONS ELECTRONICS INC.™
Emergency Operations Center

New FCC Rules Mean Last Buying Opportunity for Radio Scanners

Recently, the FCC amended Parts 2 and 15 of its rules to prohibit the manufacture and importation of scanning radios capable of intercepting the 800 MHz. cellular telephone service. The Electronics Communications Privacy Act prohibits the intentional interception of cellular telephone transmissions. Supplies of scanners that are capable of being modified to receive full 800 MHz. coverage such as the Bearcat 200XLT and 2500XLT are in *very* short supply. If you need technical assistance or recommendations to locate a special scanner or solve a communications problem, call the **Communications Electronics Inc. technical support hotline for $2.00 per minute at 1-900-555-SCAN.**

Radio Scanners

Bearcat® 2500XLT-J

List price $649.95/**CE price $339.95/SPECIAL**
400 Channels • 20 Banks • Turbo Scan
Rotary tuner feature • Auto Store • Auto Sort
Size: 2-3/4" Wide x 1-1/2" Deep x 7-1/2" High
Frequency Coverage: 25.0000 - 549.9950, 760.0000 - 823.9950, 849.0125 - 868.9950, 894.0125 - 1,300.0000 MHz.

Signal intelligence experts, public safety agencies and people with inquiring minds that want to know, have asked us for a world class *handheld* scanner that can intercept just about any radio transmission. The new Bearcat 2500XLT has what you want. You can program frequencies such as police, fire, emergency, race cars, marine, military aircraft, weather, and other broadcasts into 20 banks of 20 channels each. The new rotary tuner feature enables rapid and easy selection of channels and frequencies. With the AUTO STORE feature, you can automatically program any channel. You can also scan all 400 channels at 100 channels-per-second speed because the Bearcat 2500XLT has TURBO SCAN built-in. To make this scanner even better, the BC2500XLT has AUTO SORT - an automatic frequency sorting feature for faster scanning within each bank. Order your scanner from CEI.

A modification sheet with instructions to restore full 800 MHz. coverage for the Bearcat 2500XLT or Bearcat 200XLT may be ordered for $8.00. To order any Bearcat radio product call 1-800-USA-SCAN.

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Bearcat 8500XLT-J base/mobile	$369.95
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Bearcat 2500XLT-J handheld	$339.95
Sportcat 150-J handheld	$199.95
Bearcat 760XLT-J base/mobile	$199.95
Bearcat 700A-J info mobile	$149.95
Bearcat 560XLA-J base/mobile	$84.95
Bearcat 220XLT-J handheld	$229.95
Bearcat 200XLT-J handheld	$199.95
Bearcat 148XLT-J base/WX alert	$88.95
Bearcat 120XLT-J handheld	$159.95
Bearcat BCT2-J info mobile	$139.95

NEW! RELM® WHS150-J

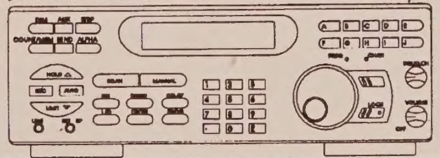
List price $481.67/**CE price $339.95/SPECIAL**
16 Channel • 5 Watt VHF scanning transceiver
Size: 2.45" Wide x 1.38" Deep x 6.4" High
Frequency range: 148.000 to 174.000 MHz. continuous coverage. Will also work 144.000-148.000 MHz. with reduced performance.

The RELM WHS150 is our most popular programmable five watt, 16 channel handheld transceiver with built-in CTCSS, which may be programmed for any 39 standard EIA tones. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in both 5.0 and 6.25 KHz. increments. Other features include scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and much more. When you order the WHS150 from Communications Electronics Inc., you'll get a complete package deal including antenna, battery, belt clip and user operating instructions. Other accessories are available. A leather carrying case with swivel belt loop part **#LCWHS** is $49.95; rapid charge battery charger, part **#BCWHS** is $69.95; speaker/microphone, part **#SMWHS** is $54.95; extra ni-cad battery pack, part **#BP007** is $59.95. The radio technician maintaining your radio system must order programming instructions part **#PI150** for $18.00 to activate this radio.

Bearcat® 8500XLT-J

List price $689.95/**CE price $369.95/SPECIAL**
500 Channels • 20 banks • Alphanumeric display
Turbo Scan • VFO Control • Priority channels
Auto Store • Auto Recording • Reception counter
Frequency step resolution 5, 12.5, 25 & 50 KHz.
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High
Frequency Coverage:
25.000 - 28.995 MHz. (AM), 29.000 - 54.000 MHz. (NFM), 54.000 - 71.995 MHz. (WFM), 72.000 - 75.995 MHz. (NFM), 76.000 - 107.995 MHz. (WFM), 108.000 - 136.995 MHz. (AM) 137.000 - 173.995 MHz. (NFM), 174.000 - 215.995 MHz. (WFM), 216.000 - 224.995 MHz. (NFM), 225.000 - 399.995 MHz. (AM) 400.000 - 511.995 MHz. (NFM), 512.000 - 549.995 MHz. (WFM) 760.000 - 823.9875 MHz (NFM), 849.0125 - 868.9875 MHz (NFM) 894.0125 - 1,300.000 MHz. (NFM).

The new Bearcat 8500XLT gives you pure scanning satisfaction with amazing features like Turbo Scan. This lightning-fast technology featuring a triple conversion RF system, enables Uniden's best scanner to scan and search up to 100 channels per second. Because the frequency coverage is so large, a very fast scanning system is essential to keep up with the action. Other features include ***VFO Control*** - (Variable Frequency Oscillator) which allows you to adjust the large rotary tuner to select the desired frequency or channel. ***Counter Display*** - Lets you count and record each channel while scanning. ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. ***20 banks*** - Each bank contains 25 channels, useful for storing similar frequencies in order to maintain faster scanning cycles. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC8500XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited warranty from Uniden. Order your BC8500XLT from Communications Electronics Inc. today.



CB/GMRS Radios

The Uniden GMR100 is a handheld GMRS UHF 2-way radio transceiver that has these eight frequencies installed: 462.550, 462.725, 462.5875, 462.6125, 462.6375, 462.675, 462.6625 and 462.6875 MHz. This one watt radio comes with flexible rubber antenna, rechargeable ni-cad battery, AC adapter/charger, belt clip, F.C.C. license application and more.

Cobra 2000GTL-J SSB Deluxe CB Base	$389.95
Uniden GMR100-J GMRS Handheld	$159.95
Uniden WASHINGTON-J SSB CB Base	$189.95
Uniden GRANTXL-J SSB CB Mobile	$139.95
Uniden PRO538W-J CB & Weather	$59.95

Shortwave

ICOM AH7000-J super wideband discone type antenna	$99.95
Grundig Satellit 700-J portable with 512 memory &AC adapt.	$389.95
Grundig Yacht Boy 400-J digital portable shortwave	$199.95
Grundig Yacht Boy 230-J portable shortwave	$139.95
Sangean ATS202-J ultra compact 20 memory shortwave	$79.95
Sangean ATS606-J ultra compact 45 memory shortwave	$149.95
Sangean ATS606P-J shortwave with antenna & AC adapter	$169.95
Sangean ATS800-J portable 20 memory shortwave	$69.95
Sangean ATS803A-J portable with SSB reception & AC adapter	$159.95
Sangean ATS808-J portable 45 memory shortwave	$159.95
Sangean ATS818-J portable without cassette recorder	$189.95
Sangean ATS818CS-J with cassette recorder	$209.95
Sangean ANT60-J portable shortwave antenna	$9.95

Weather Stations

Public safety agencies responding to hazardous materials incidents must have accurate, up-to-date weather information. The Davis Weather Monitor II is our top-of-the-line weather station which combines essential weather monitoring functions into one incredible package. Glance at the display, and see wind direction and wind speed on the compass rose. Check the barometric trend arrow to see if the pressure is rising or falling. Our package deal includes the new high resolution 1/100 inch rain collector part **#7852-J**, and the external temperature/humidity sensor, part **#7859-J**. The package deal is order **#DAV1-J** for $524.95 plus $15.00 shipping. If you have a personal computer, when you order the optional Weatherlink computer software for $149.95, you'll have a powerful computerized weather station at an incredible price. For the IBM PC or equivalent order part **#7862-J**. For Apple Mac Plus or higher including Quadra or PowerBook, order part **#7866-J**.

Other neat stuff

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Uniden EXP9100-J 900 MHz. 1 line cordless phone	$269.95
Cobra CP910-J 900 MHz. spread spectrum cordless phone	$249.95
ICOM GP22-J handheld global positioning system	$699.95
WR200-J weather radio with storm alert	$39.95
RELM WHS150-J VHF handheld 5 watt, 16 ch. transceiver	$339.95
RELM RH256NB-J VHF 25 watt synthesized transceiver	$289.95
Ranger RCI2950-J 25 watt 10 meter ham radio	$244.95
Ranger RCI2970-J 100 watt 10 meter ham radio	$369.95
Uniden LRD9000W1-J Super Wideband Laser/Radar Detector	$169.95
HCPC-J HamCall CD Rom for IBM PC by Buckmaster Publishing	$39.95
PWB-J Passport to Worldband Radio by IBS	$10.95
POL1-J Police Call for CT, ME, MA, NH, NY, RI, VT	$5.95
POL2-J Police Call for DE, MD, NJ, PA	$5.95
POL3-J Police Call for Michigan & Ohio	$5.95
POL4-J Police Call for IL, IN, KY, WI	$5.95
POL5-J Police Call for IA, KS, MN, MO, NE, ND, SD	$5.95
POL6-J Police Call for DC, FL, GA, NC, PR, SC, VA, WV	$5.95
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POL8-J Police Call for AZ, CO, ID, MT, NM, NV, UT, WY	$5.95
POL9-J Police Call for California, Oregon & Washington	$5.95
ANTK-J VHF scanner/VHF transmitting antenna PL259 connector	$29.95
ANTMMBNC-J magnet mount scanner antenna w/ BNC connector	$29.95
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ANTMMPL-J magnet mount scan antenna with PL259 connector	$29.95
ANTSGBNC-J glass mount scanner antenna with BNC connector	$29.95
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CIRCLE 28 ON READER SERVICE CARD

Mysteries of the UHF Military Band

It's Growing in Popularity, but this Intriguing Band Still Remains a Blank to Most Scanner Owners.

BY TOM KNEITEL, K2AES, EDITOR

Odd that a frequency band with so much to offer could be kicked around, misunderstood, and ignored as much as the chunk of communications spectrum that runs between 225 and 400 MHz. Think about it. This is far more frequency space than the combined total of all the spectrum below 512 MHz usually covered by an average scanner. Yet, 225 to 400 MHz, commonly known as the UHF military aero band, swarms with activity.

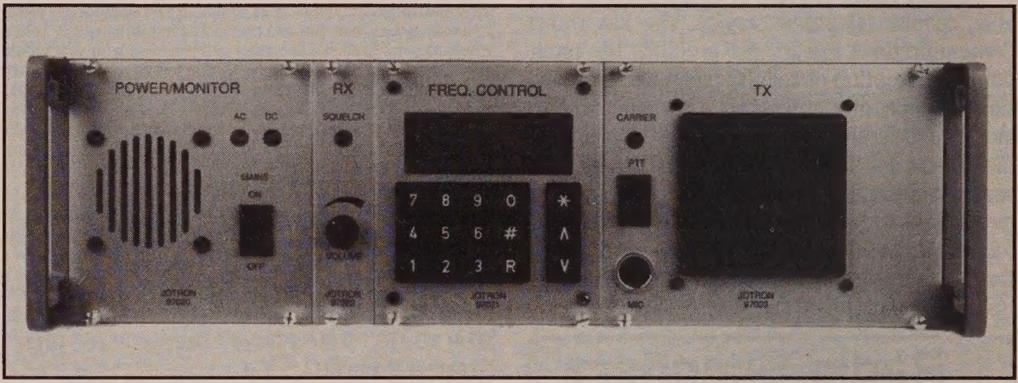
This is the band where military aircraft communicate during practice dogfights, while conducting air-to-air refueling operations, and when patrolling the skies as part of the air defenses of the USA and Canada. It's where military aircraft obtain weather ("metro") information, and an important band during military and Coast Guard search and rescue operations. NASA uses this band, especially in conjunction with the Space Shuttle program. US Customs Service and Coast Guard pilots communicate here while they track smuggling suspects aboard ships and aircraft. The Department of Energy has its aeronautical operations here, as well as FAA and Dept. of Commerce activities.

There are military transports; US Navy fighters; National Guard, Army, and US Coast Guard helicopters; B-52 bombers; E-3 *Sentry* radar planes; hurricane hunters; flying tankers; training flights, and more. There are air-to-air (A/A) and air-to-ground (A/G) communications.

Playing Hard to Get?

You'd think that with all of this exciting chatter going on, scanner manufacturers would fall all over themselves offering this wonderful band in every single radio they designed. But no, the majority of scanners to come out have not included coverage of the 225 to 400 MHz band. This isn't to say that *none* have appeared.

While most scanners bypass this band, there are some that cover it in style. Thankfully, this appears to be a growing trend. The first major scanner to cover the band was Radio Shack's Realistic PRO-2004. The company continued the UHF military band coverage in the subsequent model PRO-2005, and the present PRO-2006 version. Radio Shack's PRO-43 handheld also receives the UHF military band.



The Jotron 9000 is a 25-watt ground station transceiver for the 225 to 400 MHz band. It's made by Jotron Electronics, of Tjodalyng, Norway.

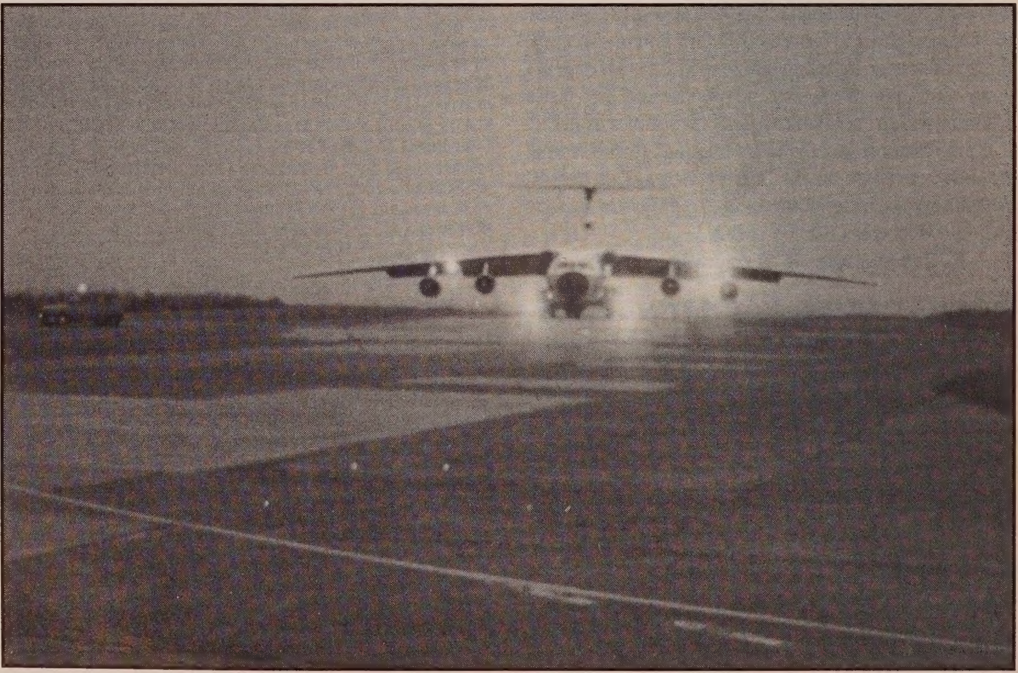
ICOM receivers R7000 and R9000 cover the band, along with the company's IC-R100 base/mobile scanner, and their IC-R1 handheld scanner.

The Trident base scanner TR-4500, also the TR-980, TR-1200, and TR-2400, and other models, include the band.

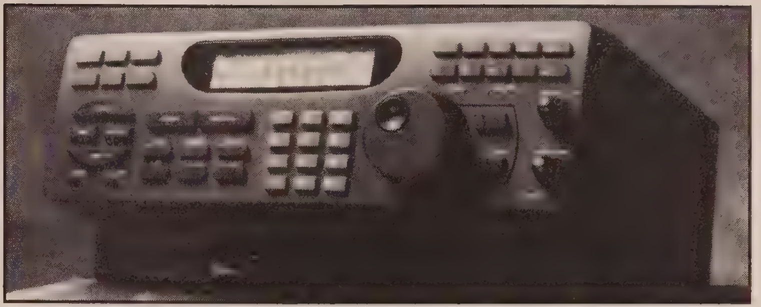
Uniden Bearcat BC-890XLT and BC-8500XLT base scanners include the UHF military band, as does the BC-2500XLT handheld.

Additional scanners covering this band include AOR scanners, the Standard AX-700, the Shinwa SR001, and the Fairmate HP2000, among others.

At this point, excellent equipment is readily available to monitor UHF military aero communications. But remember, only



This C-5A military transport is typical of the aircraft to be monitored in the UHF military band.



Uniden Bearcat's BC-890 base station scanner.

▲*Radio Shack's PRO-2006 base station scanner is a sophisticated unit that incorporates coverage of 225 to 400 MHz.*

◄*US Army maneuvers using this UH-60 Blackhawk helicopter include comms in the UHF band. (US Army photo.)*

certain scanners will fit the bill for this particular band. These consist of only a small percentage of the scanners and receivers now on the market, and they are among the more sophisticated units going. As such, they tend to be priced more towards the higher end of the price scale than the units that don't receive UHF military aero communications.

As soon as the first scanners arrived covering the UHF military band, a small but fanatic cadre of enthusiasts was born. These people have always welcomed newcomers into the fold, but somehow scanner hobbyists never quite knew what to make of these frequencies. It still carries the aura of an "insiders' band." But it finally looks as though this is a band whose time has now arrived. Interest and fans have been steadily growing. Soon it might take its rightful place as a generally popular scanner band.

Receiving

Military air/air and air/ground communications in the 225 to 400 MHz band are conducted in AM mode, same as the VHF aero band. Some military communications satellites also operate in portions of this band, and use FM, however they are not the topic of this feature.

This band is now established with 25 kHz channel spacing (i.e. 225.125, 225.175 MHz, etc.), although the most active channels appear at 100 kHz increments (i.e. 225.1, 225.2, 225.3 MHz, etc.). To a lesser degree, activity will also be found at 50 kHz (i.e. 225.15, 225.25 MHz, etc.) and 25 kHz steps (i.e. 225.125, 225.175 MHz, etc.).

A popular way of monitoring 225 to 400 MHz is put the scanner into search/scan mode at 12.5 kHz steps (don't forget that it must be in AM mode), and then sort through the band from one end to the other. Because of the large amount of spectrum to be covered, it's best to break it up into 5 MHz-wide segments. Check out each segment for several days at a time, then move on to the next, keeping a record of those channels of most interest.

For your convenience, a log of more than 80 selected frequencies accompanies this feature. These are some channels in this band that are more or less national in usage. They can aid the monitor in spotting active channels of particular interest. The frequencies shown here represent only a fragment of the total number that can produce activity in any given area.

Virtually all military facilities that have any aeronautical activity utilize this band. But did you know that many civil airports with control towers also have frequencies in this band? In addition, National Guard and Reserve units operating from civil airports maintain frequencies in the UHF military band. Plus, the FAA's extensive Air Route Traffic Control Center network, evident in the VHF aero band, is equally operational in the 225 to 400 MHz band.

You may want to back up your search/scan efforts with further information, or look up specific installations to learn their frequencies. Two reference sources strive to list UHF military aero band frequencies and services at all military bases and also all the civil airports in North America. One is my own book, *Top Secret Registry of US Government Radio Frequencies, 8th Edition*. UHF military aero band information in the book covers all areas of the USA, Canada, Mexico, and the Caribbean. The volume also includes all National Guard and Reserve forces communications, plus many non-military users such as FAA, NASA, Dept. of Energy, aerospace contractors, etc.

The other complete source is the *Directory of North American Military Aviation Communications*. This reference is divided into four regional volumes, each covering various states and Canadian provinces. It also provides military HF and communications satellite frequencies.

Selected 225 to 400 MHz Frequency List

229.6	US Army Aviation control towers
230.4	Dept. of Energy opns.
231.0	NASA
234.5	Air-to-Air (A/A) common
234.8	Air Combat Command tactical A/A
236.6	USAF control towers
239.4	Dept. of Energy opns.
239.8	Metro (Weather)
237.9	USCG Search/Rescue
238.2	Air Combat Command tactical A/A
240.2	US Customs Service
240.4	NASA
240.6	US Coast Guard
240.8	NASA
241.0	US Army & National Guard
241.2	NASA
241.6	NASA
241.65	US Coast Guard
241.8	NASA
242.0	NASA
242.4	National Guard
242.7	US Army A/A
243.0	Emergency frequency
250.7	US Navy
251.9	NASA Space Shuttle opns.
252.8	US Navy/Air Force Search/Rescue
254.2	US Customs Service
255.4	FAA Flight Service Stations
257.0	Dept. of Energy opns.
257.8	Control towers
258.2	Air Combat Command tactical A/A
259.0	US Air Force Search/Rescue
259.7	Dept. of Energy opns.
263.8	US Coast Guard
266.5	Air Combat Command tactical A/A
269.0	US Customs Service
270.0	US Navy A/A
271.0	US Navy (aircraft carrier opns.)
271.5	US Air Force A/A
271.9	Air Combat Command tactical A/A
272.7	FAA Flight Service Stations
276.1	E3 Sentry A/A refueling opns.
277.8	US Navy/Coast Guard common
279.5	FAA operations
281.4	US Customs Service
282.0	US Coast Guard
282.425	US Customs Service
282.8	Search/Rescue
288.6	Air Combat Command tactical A/A
289.4	Canadian radar approach opns.
289.7	Air Combat Command tactical A/A
290.2	US Customs Service
292.0	Air Mobility Command
292.1	Global Command Control System
300.6	Air Combat Command tactical A/A
303.0	US Air Force A/A
304.8	NOAA Hurricane Hunters
305.7	USAF Readiness Command
311.0	Air Combat Command A/G primary
315.1	Dept. of Energy opns.
319.4	Air Mobility Command command posts
321.0	Air Combat Command A/G secondary
324.9	US Navy (aircraft carrier opns.)
333.3	A/A
340.2	US Navy control towers
342.2	US Coast Guard
342.5	Metro US/Canada
344.6	Metro US/Canada
349.4	Air Mobility Command
351.2	US Air Force Reserve
353.9	US Customs Service
354.3	Air Combat Command tactical A/A
356.8	Air Combat Command tactical A/A
360.2	US Navy control towers
363.9	Air Combat Command tactical A/A
364.2	NORAD US/Canada
372.2	Pilot to Dispatcher A/G
375.2	Metro US/Canada
380.0	FAA opns.
381.0	US Air Force Search/Rescue
381.1	Air Combat Command tactical A/A
381.3	Air Combat Command
381.7	US Coast Guard
381.8	US Coast Guard/Custons Service
383.9	US Coast Guard Search/Rescue
386.5	US Navy Search/Rescue
390.15	US Air Force A/A refueling

Also useful is *The Comprehensive Guide To Military Monitoring*, by Steve A. Douglass. This book lists numerous UHF frequencies at major USAF installations, and also at a number of other miscellaneous American military bases.

There are excellent scanner groups offering membership newsletters that carry information about UHF military band communications at times. These include:

Radio Communications Monitoring Assn. (RCMA), P.O. Box 542, Silverado, CA 92676. Subscription to *Scanner Journal* is $24 per year. Sample issue $2.

Radio Monitors of Maryland Newsletter, P.O. Box 394, Hampstead, MD 21074. Subscription is $15 per year. Sample copy, $2.

Northeast Scanner News, P.O. Box 62, Gibbstown, NJ 08027-0062. Subscription is $29 per year.

When contacting these groups, don't forget to tell them that Tom sent you.

Towards Optimum Reception

Most so-called "all band" scanner antennas seem to perform well enough on the standard police and fire bands, but less than great on this band. A discone is okay, but some users report better results can be obtained with an omni-directional antenna designed for use in the 222 to 225 MHz ham band. Optimum reception can be expected with an antenna actually designed and peaked for the center of this band, which is nearly 100 MHz higher than a 225 MHz ham band antenna.

Best receiving results call for an outside-mounted antenna, placed as high and in the clear as possible. Try to locate it away from other antennas, electric lines, and any line-of-sight obstructions. Especially electric lines, since they radiate RF noises and are a shock hazard.

Runs of more than 50 feet of coaxial cable should use RG-8/U, or other low-loss type. Avoid RG-58/U at these frequencies because of the signal attenuation.

For that extra kick, a scanner owner can add a preamplifier to give a healthy boost to the received signals. A preamplifier attaches to a scanner's antenna connector, and then the antenna plugs into it. The device needs no internal wiring connections to the scanner. It is powered by a battery or external power supply.

There are doubtless many scannists tuning the UHF military band "barefoot"—with "all band" antennas, and no accessories or extras. That will bring in some activity. But why settle for just that? My intent is to point out ways to maximize the potentials on this band and give you the most from your scanner and your hobby.

The UHF communications range is largely dependent upon line-of-sight. That

The Uniden Bearcat BC-2500 handheld covers the UHF military band.

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* *"The best...built like an antenna should be."* –Larry Magne in ***World Radio TV Handbook***
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Radio Shack PRO-43 handheld scanner offers UHF military band coverage.

TRIDENT TR-980

The Trident TR-980 is a handheld covering the UHF military band, along with the other action bands.

means high altitude military aircraft can be monitored hundreds of miles distant from your location. Based on optimum ground receiving facilities and weather conditions, with no line of sight obstructions, a plane at an altitude of 30,000 feet has a signal coverage potential of 230 (statute) miles in all directions below the aircraft. If the aircraft is flying at 50,000 feet, the potential ground receiving range extends to at least 300 (statute) miles in all directions.

As a monitoring enthusiast, consider it a never-ending challenge to expand your information base and the limits of your station's reception range. The larger your station's range, the more stations to receive, the better the signals, the more things to hear. That means more enjoyment from your hobby. Ergo, better value from your equipment.

Tune In

In any given area of North America there are numerous frequencies in the 225 to 400 MHz band that will produce activity. These are unique and fascinating "action" communications that aren't to be heard anywhere else on a scanner. You have enough basics here to get you started. What are you waiting for? ■

America's Robot Battleships

Secret Radio Control Experiments Were Cutting Edge Technology

BY ALICE BRANNIGAN

USS Iowa had been a member of the US Navy's "Great White Fleet," that distinguished itself in the Spanish-American War.

You can go to the park any weekend and watch radio controlled model ships and aircraft being piloted from a distance by hobbyists. When you arrive home, you can open your garage door by pressing a button on a control device in your car. Radio controlled drones and vehicles are used by the military forces. These, and numerous other radio controlled devices can trace their roots back to historic, and often secret experiments conducted by the US Navy more than 70 years ago.

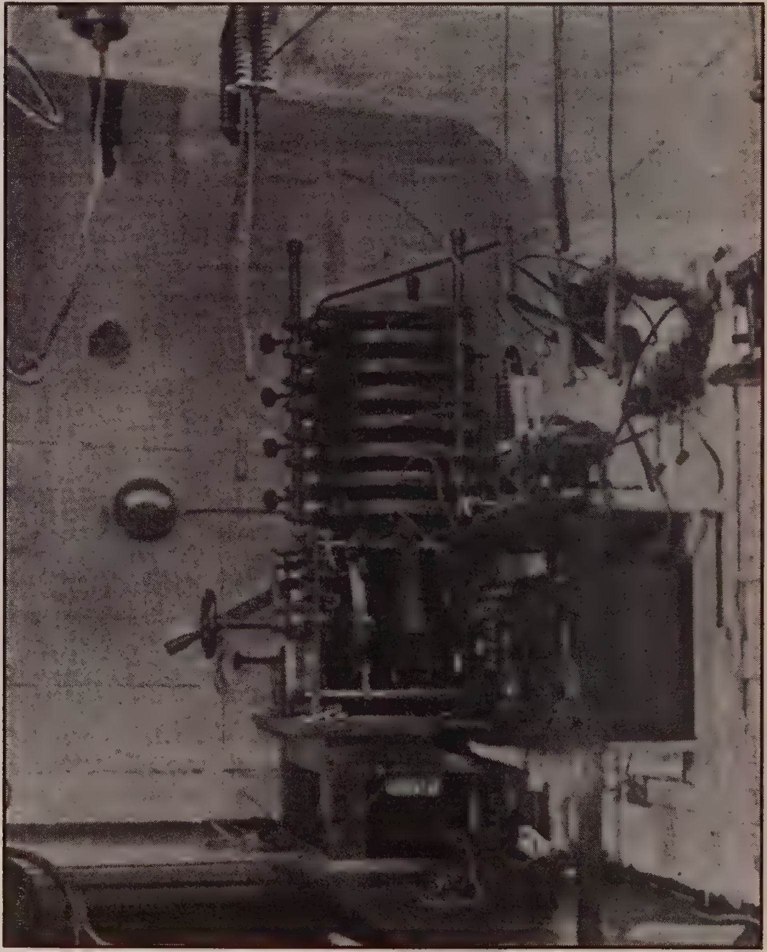
The first experiment took place in 1920, and looked towards revolutionizing naval warfare. That year, two US Navy battleships headed for the Delaware Capes for secret sea test operations. One ship was *Coast Battleship No. 4*, formerly the *USS Iowa*, BB-4, a 350-foot battleship commissioned in 1897. As the *USS Iowa*, the ship had become famous as part of our Great White Fleet during the Spanish-American war. Its radio callsign was NHT.

The other vessel on this mission was the *USS Ohio*, BB-12, call letters: *NMW*. The *Coast Battleship No. 4*, formerly the *USS Iowa*, sailed from Philadelphia with a skeleton crew. The ship had been outfitted with receiving equipment and apparatus that would allow the vessel to be operated from a distance with no persons aboard. That is to say, the starting, stopping, and speed of the engines could be controlled, as well as the steering and laying out of smoke screens. The radio control operation re-

↑

With its name changed to "Coast Battleship No. 4," the former USS Iowa became a crewless ship during secret experiments testing radio control.

A view of the radio room aboard the former USS Iowa, showing the radio control receiving equipment. This allowed the crewless battleship to be navigated from a distant vessel. →



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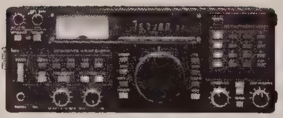
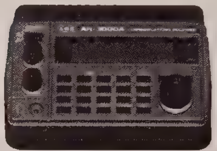


Icom IC-R-71A

Communications Receiver

$1059

This receiver covers the entire spectrum from 100 kHz to 30 MHz and is as professional in performance as they come. The latest Icom receiver performance features such as passband tuning and that excellent Icom clean receiver feel. That receiver performance is what separates this radio from its competitors. 86 dB dynamic range and 60 dB image rejection are just examples of its excellent performance in this area. Features are too numerous to list but include 32 memories, 2 VFOs, optional computer interface and 3 selectable filters.



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100 kHz all the way up to 2036 MHz (no gaps). Listen on any mode including NFM, WFM, AM, USB, LSB and CW. 400 memory channels, search and scan speed is an unprecedented 50 increments/second. RS-232 port is provided to enable full remote control. Includes telescopic whip (BNC antenna input) and DC lead. Powerful 1.2 Watts of clear audio.

Diamond RH-77CA

VHF/UHF HT/Scanner Antenna

$29.95

This great little antenna gives excellent gain on transmit through 950 MHz. Where it really shines though, is receive. Use it on your handheld scanner or receiver for much better reception than the factory antenna. 15" long.

Tucker Shortwave Antenna

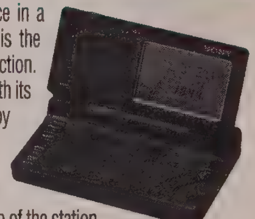
$19.95

A complete ready to install simple shortwave outdoor antenna. 40 feet long w/50 feet of coax lead-in. Specify connector, your choice of 3.5", RCA, PL-259 or BNC connector.

Sony ICF-SW100S

World Band Receiver

$379



This new receiver gives you outstanding performance in a radio small enough to fit in your shirt pocket. It is the smallest radio available that features synchronous detection. This ultimate travel radio is perfect for taking abroad with its world time clock that is adjustable to any time zone by setting it to the names of major cities around the world. It can also wake you up every morning with its built in dual clock/alarm. Keeping track of each of its 50 memories is a snap because you can store the name of the station on the LCD display. Covers 150 kHz to 30 MHz continuously as well as AM broadcast and FM stereo. Comes complete with AC power adapter, stereo headphones, power supplied active antenna, shortwave guide and carrying case. Measures only 4 3/8" x 11/16" x 2 7/8".

Grundig YB-400

Shortwave Receiver

$219

With FREE AC Adapter, $9.95 Value

The new Yacht Boy 400 was hailed as "the best compact shortwave portable tested" by the 1994 Passport to World Band Radio. It covers AM, FM stereo, and shortwave from 1.6 to 30 MHz continuously. 40 randomly programmable memory presets allow for quick access to favorite stations. The multi-function LCD display shows simultaneous display of time, frequency, band, automatic turn-on and sleep timer. A full feature clock, alarm and timer shows time in 24 hour format and even has a sleep timer programmable in 15 minute increments. Receiver performance is where this one really shines however. It features sensitivity and selectivity that no other receiver in this price range can match. Get what everyone's been talking about- the new YB-400!

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The SportCat is designed specifically for sporting events, allowing you to go from one channel to the next with just a touch of a button . You can go store up to 10 custom frequencies and for added convenience, there are also 10 corresponding channel identifiers. Features include 100 channels in 12 bands with 10 banks, preprogrammed band search, 10 priority channels, channel lockout and one touch weather. Turboscan lets you scan 100 channels per second and Turbosearch searches 300 steps per second. The unique data skip allows you to skip over unwanted data transmissions and substantially reduces birdies. Memory backup retains frequencies up to 3 days without batteries. The supplied rechargeable NiCad battery pack will supply up to 12 hours of use in the closed squelch position. Includes charger/AC adapter, rubber antenna, beltclip and earphone. Available in either black (SC150B) or striking yellow (SC150Y). 2.5" x 1.7" x 6".

Sony ICF-SW7600G

World Band Receiver **$189**

Sony brings together some of their most innovative features in this outstanding, low cost receiver. Now, for the first time, the remarkable synchronous detection feature is available in a receiver for less than $200! Not only do you get fade-free shortwave reception, but also SSB and FM stereo! Covers 150 kHz to 30 MHz continuously as well as AM and FM broadcast. You can tune via direct entry from the keypad or the up-down control. The receiver performance is typical Sony quality with dual conversion superheterodyne circuitry. Tuning is in 1 kHz steps with a large LCD display. Includes 22 station presets, a built-in clock with sleep timer and a large 3" speaker. Comes complete with compact antenna and guide book. One of the most exciting new receivers in years!

AEA FAX II

Multi-Mode Receiving System

$99

With the AEA-FAX II, receiving WEFAX images and wire photos, morse code, RTTY and NAVTEX transmissions couldn't be easier. Simply plug in the supplied interface to your PC compatible computer's serial port, connect the other end to any HF receiver's headphone or speaker output and go! The supplied software will display up to 16 levels of gray with a VGA monitor and even allow you to keep a fax-station database to keep a log of stations heard. It supports com ports 1-4 and will even allow you to use a serial device on the same port! Start seeing what you've been missing- order an AEA-FAX II today!

JIM M51

Scanner Pre-Amp

$79

The M51 is the perfect companion for your handheld scanner or receiver. It features 20 dB gain over a wide 24 to 2150 MHz frequency coverage. GaAs FET design insures low-noise gain over the entire spectrum. Just hook up the M51 to your handheld scanner, hook the antenna to the M51 and go! Uses 2 AA batteries, BNC connectors.

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Tucker TSA-600

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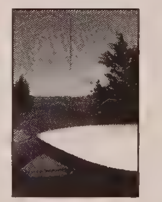
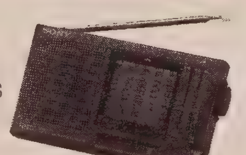


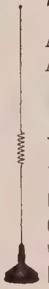
This glass-mount antenna is perfect for those of you that do not want to drill a hole or place a magnet mount on your vehicle. It installs on both sides of your window glass with no need to drill any holes. The signal is transferred through the glass, making installation a snap. It covers the entire scanner spectrum of 30 to 1200 MHz and is only 22" high. Comes complete with 17' of RG-58 coax and BNC connector. Of course, it comes with our 1 year warranty behind it and our SatisfactionPlus guarantee.



Sony ICF-SW10

World Band Receiver **$49.95**

For the first time in shortwave history, a shortwave radio is available for under $50 that actually works! When we first received this radio for evaluation, we assumed it would be like every other radio in its class and offer mediocre at best performance. We were pleasantly shocked when we discovered it offered outstanding selectivity and sensitivity. This radio is great as a travel radio, a starter radio, gift, or just for people that prefer an analog dial. Covers 9 shortwave bands, FM STEREO, and AM broadcast.



Tucker TSA-75

Magnetic Mount Mobile Scanner Antenna

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The TSA-75 is an outstanding magnet-mount scanner antenna for 25 to 1300 MHz. The 19" whip is stainless steel for rust-proof performance for years to come. Our super-strong magnet is better than anything we've ever carried before. 12' of RG-58 coax comes complete with a BNC connector for easy connection to your scanner. We warranty this antenna for one year and as with our other Tucker Brand products, it comes with our 30 day SatisfactionPlus guarantee.

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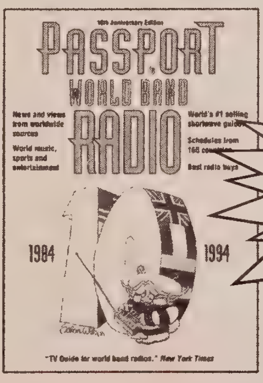
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Setting the industry standard once again for shortwave receivers, the NRD-535D is the most advanced HF communications receiver ever designed for the serious DXer and shortwave listener. Its unparalleled performance in all modes makes it the ultimate receiver for diversified monitoring applications.

Designed for DXers by DXers! The NRD-535D (shown above with optional NVA-319 speaker) strikes the perfect balance between form and function with its professional-grade design and critically acclaimed ergonomics. The NRD-535D is the recipient of the prestigious World Radio TV Handbook Industry Award for "Best Communications Receiver."

- Phase-lock ECSS system for selectable-sideband AM reception.
- Maximum IF bandwidth flexibility! The Variable Bandwidth Control (BWC) adjusts the wide and intermediate IF filter bandwidths from 5.5 to 2.0 kHz and 2.0 to 0.5 kHz—continuously.
- Stock fixed-width IF filters include a 5.5 kHz (wide), a 2.0 kHz (intermediate), and a 1.0 kHz (narrow). Optional JRC filters include 2.4 kHz, 300 Hz, and 500 Hz crystal type.
- All mode 100 kHz – 30 MHz coverage. Tuning accuracy to 1 Hz, using JRC's advanced Direct Digital Synthesis (DDS) PLL system and a high-precision magnetic rotary encoder. The tuning is so smooth you will swear it's analog! An optional high-stability crystal oscillator kit is also available for ±0.5 ppm stability.
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The term “robot”didn’t come into existence until 1923, which was after the USS Iowa experiments. The idea of mechanical objects being operated from afar by radio signals has captured the public’s imagination ever since. (This robot is from the 1960’s.)

The USS Utah was the second battleship converted into a robot target vessel.

quired converting the boilers to operate from oil rather than coal. Automatic devices for feeding the fuel to the burners and supplying water to the boiler were provided.

The radio control apparatus consisted of a standard transmitter aboard the *Ohio*, a receiving antenna on the *Iowa* with special receivers, amplifiers, relays, etc., for converting the signals into a form that would operate the different on-board controls. A safety device was provided that automatically shut everything down in case no control signals were received after a predetermined interval.

Arriving at the Delaware Capes, the *Iowa* was abandoned and then control was turned over to officers aboard the *USS Ohio*. The radio control system, designed by John Hays Hammond, Jr., operated without any problems.

It had been decided that if the former *Iowa* handled well under remote control, the Navy could utilize it as a radio controlled target ship. Its first such test was in June, 1921. The vessel was dispatched to various points between 50 and 100 miles off the Virginia Capes. When the ship had been spotted by a US Navy blimp, four “NC” type flying boats, 12 “F-5-L”, plus four Martin bombers came out and all dropped dummy bombs towards two large white targets that had been painted on the former *Iowa’s* decks.

In March, 1923, during maneuvers at Panama Bay, *Coast Battleship No. 4*, the first radio controlled battleship, was sent to the bottom by a fusillade of 14-inch shells. After 27 years of good service, stripped of all armament, and not permitted the dignity of keeping her good name, the *Iowa* was intentionally sunk by “friendly fire.” A sad end for the old warrior.

Robots Catch the Public’s Fancy

Even today, operating a 360-foot warship by remote control is impressive. It isn’t easy to imagine just how advanced any remote control technology was thought of 70 years ago. Machines that could be operated without a human standing there to turn knobs and pull levers were the stuff of science fiction.

It wasn’t until 1923 that the word “robot” came into existence. That occurred in a popular science fiction play titled *R.U.R.* It dealt with an imagined future state in which robots, enslaved to do work for humans, revolt against their masters. The initials stood for “Rossum’s Universal Robots,” the name of the commercial firm that manufactured the mechanical creatures. *R.U.R.* was written by Czech playwright Karel Capek, who said he adapted the word “robot” from the Czech word *robotit*, meaning “to drudge.” His play, produced on Broadway, was a big hit and generated significant public interest in remote control. Also, it added the word “robot” to our vocabulary. That was 71 years ago.

The Next Robot Battleship

In 1931, the US Navy decided that technology had advanced sufficiently to test another robot battleship. Under the terms of the 1922 Washington Naval Treaty, the *USS Utah*, BB-31, (callsign NIQJ) was selected to be stripped of her battleship designation and reclassified as a mobile target and anti-aircraft training ship known as *USS Utah*, AG-16. First commissioned in 1911, the 522-foot battleship was a veteran of the 1914 hostilities in Vera Cruz, then the ship served during World War I on convoy duty.

No longer a dreadnought, in 1932 the *Utah* was cleared of all armaments and equipped with a radio control guidance system. For the most part, this was an updated version of same radio control system developed by John Hays Hammond, Jr., used more than 10 years earlier on the former *USS Iowa*.

Original plans were to test the *Utah* system to make certain it worked, then use the ship as a target vessel to let aircraft crews practice up on their bombing techniques. Developments in new bombs, guns, and fire control were also to be tested. That meant, at some point the *Utah* was slated to be deliberately sunk, suffering a similar humiliating fate as its predecessor.

In the *Utah* trials, control signals were sent from ships and also from aircraft. Surveillance aircraft were used to observe the tests and report how the robot ship was responding to its radio controlled instructions.

Rather than sink the *Utah* at the end of its radio control tests, the ship was allowed to remain in operation as a fleet auxiliary. Over the following years the former battleship had a regular crew and performed a vital service, primarily as a mobile target. This contributed realism to the training of naval aviators.

The *USS Utah*, AG-16, was destroyed by the surprise enemy air attack at Pearl Harbor, Hawaii, on December 7, 1941. The *Utah’s* wreckage may still be seen, partially righted and turned inshore near where she capsized on the far side of Ford Island. Of the ship’s complement, 30 officers and 431 enlisted men survived; six officers and 58 men died. The once powerful battleship had served the Nation for 30 years, then her career ended with honor. The ship’s bell is displayed by the Utah Historical Society in Salt Lake City.

Radio Control Comes into its Own

By the late 1930’s, radio control had progressed to the point where it could become a practical military tool. Tests were being conducted with land mines selectively triggered by radio, as well as using radio controlled tanks and field artillery.

After the attack on Pearl Harbor, one

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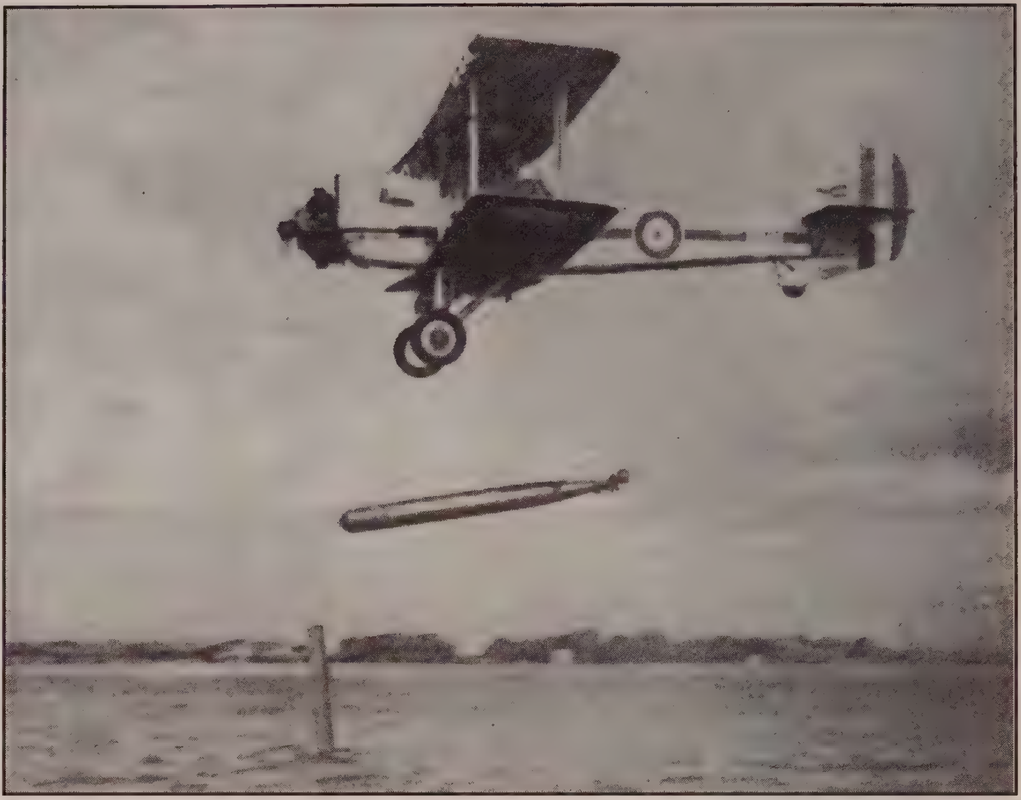
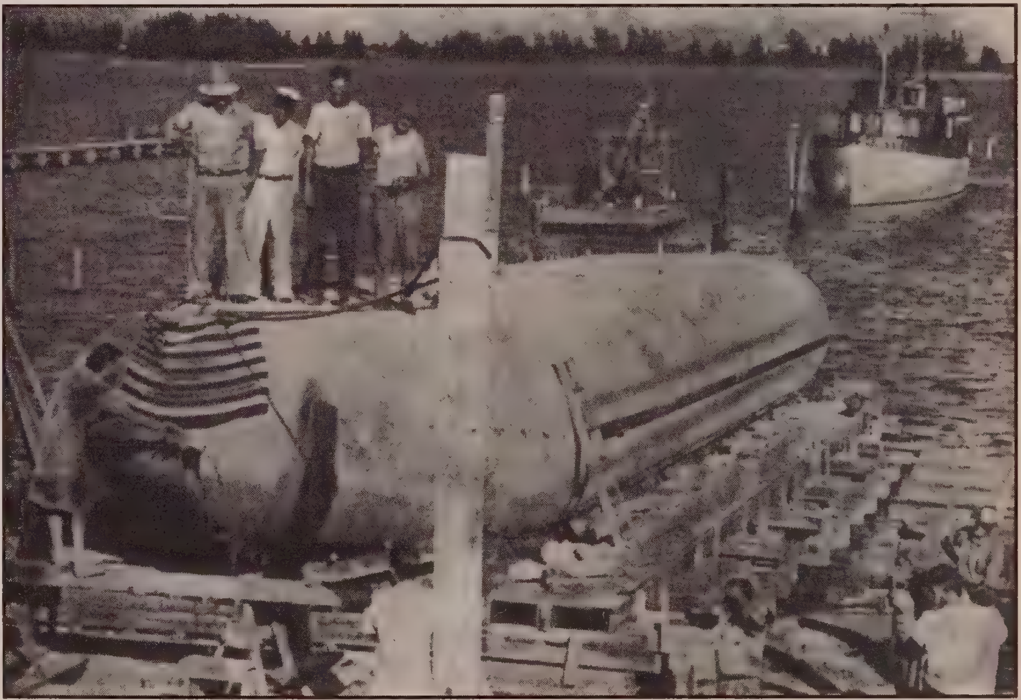


In a 1935 test, the British "Queen Bee" radio controlled drone aircraft was able to release a torpedo.

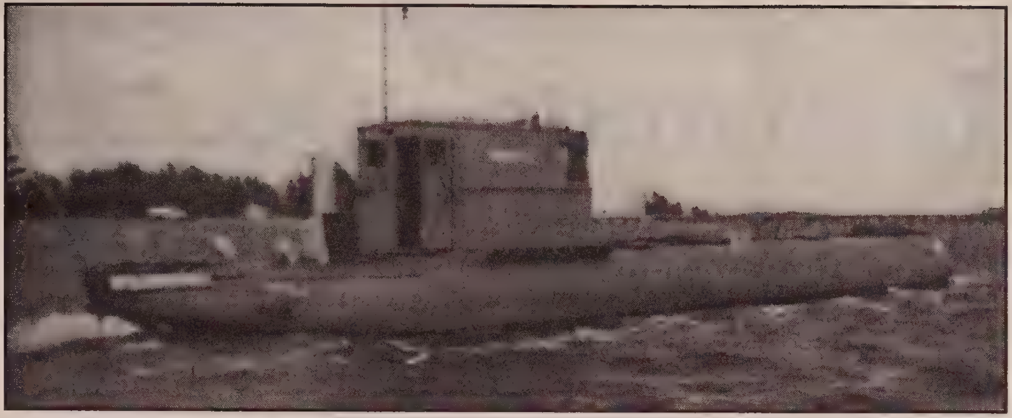
World War II experiment in radio controlled ships is interesting to note. In 1942, at a Florida shipyard, a 91-foot scale model of a proposed robot ship was launched for testing by the government. The ship was then taken to the Capitol Yacht Basin at Washington by its developers F.B. Woodworth, and Vladimir Yourkevitch. Woodworth was a Bell Telephone Labs radio expert who helped develop ship-to-shore radiotelephone service. Yourkevitch had designed the hull of the luxury French ocean liner, *S.S. Normandie*.

This 91-foot boat, named the *Phantom*, looked nothing like an ocean-going craft. It was nominally a yacht. When it arrived in Washington from Florida, it had a temporary "Wilmington" home port plaque on its stern. There was a temporary cabin structure for the crew of two. But the *Phantom* was no yacht.

With the temporary cabin removed, the deck of the *Phantom* was almost flush with the water line. There were no smokestacks, superstructure, or cabins. This was a concrete-hulled robot ship, and the revolution-



The 91-foot concrete hulled "Phantom" was launched in 1942. This was a working 1/3-size scale model of a proposed sea-going robot cargo vessel to be operated by radio control.



Three-quarter rear view of the "Phantom," shown with the temporary cabin structure for the crew of two that took her to Washington for tests.

ary concept was that it was designed to travel in convoys of ten or more operated by radio control.

In convoy, the completely automatic crewless cargo ships were expected to slip through the water at 10 knots, invisible to enemy raiders beyond a radius of two miles. Their movement was to be controlled by an escort naval "mother" ship using a secret system of coded instructions transmitted on VHF frequencies.

In the event the control vessel was sunk, the robot vessels would maintain their same course for two hours, Then devices aboard would automatically shut down the engines and sent out a distress call containing the approximate position.

The 91-foot trial *Phantom* was built to approximately 1/3-scale. The proposed full-sized robot vessels were to be 260 feet in length, 36 feet on the beam, and 27 feet deep. This was small for modern shipping at this time, though they would have a deadweight of 2,000 tons. Diesel engines of 1,000 horsepower were to drive them under robot control. Except for air intakes required for the engines, the craft were to be completely sealed.

A series of 10 to 15 watertight compartments were designed with the intention of making the robot ships almost invulnerable to torpedo attack. In the event a torpedo hit caused a compartment to flood, ballast tanks with automatic pumps would trim the ship. All vital parts were to be concentrated within a space less than a tenth of the ship's total length.

Woodworth and Yourkevitch believed that robot convoys would save the lives of merchant seamen and help solve wartime shipping problems. Results of the tests conducted for and by the government aren't known, but the design may have been an early prototype of the WWII vessels bearing US Maritime Atministration type designation C1-S-D1. These were steam-turbine powered, concrete-hulled supply barges, 366 feet in length, and weighing 4,863 tons. They were used by the US Army and Navy. No information is readily available as to how many were built, or if any were radio controlled.

WWII brought with it radio controlled bombs and tanks used by the Allied and Axis forces, alike.

Keep 'em Flying

The US Navy began testing radio controlled aircraft in 1924. A series of dives and turns was executed using a pilotless plane controlled by a system similar to the one designed by Hammond. The test flight went well, but when there was a slight glitch in the control signal, it caused the aircraft to crack up.

The British demonstrated their *Queen Bee* drone aircraft in 1935. This consisted of a regular Royal Navy plane specially outfitted with receiving equipment that allowed it to be radio controlled from a distance. It was used for target practice, but could also release a torpedo.

Then, in 1936, the US Navy outfitted an N2C-2 biplane with radio control equipment for another try. The kinks had been worked out of the earlier design, and this system worked well. Two years later, the same aircraft was used as a pilotless flying target so anti-aircraft crews aboard the aircraft carrier *USS Ranger*, CV-4, could hone their skills.

Radio controlled drones became popular aircraft gunnery targets throughout WWII, as used by land, sea, and air forces. WWII also brought about weapons known as *Azons*, radio controlled 1,000 pound aircraft bombs. They had limited ability to be steered towards their targets as they fell, and they were controlled by the bombardier in the aircraft that had released them. *Azon* bombs were effectively used in 1944 by the US Army Air Corps doing pinpoint bombing of Germany's river locks.

By 1947, shortly after the end of WWII, the US Air Force sent a radio controlled, crewless transport aircraft from the USA to England, and back again.

These were the early experiments (some considered secret at the time), devices, and uses of radio signals and their capabilities to control devices from a distance.

Your letters and comments are always invited and welcomed. This column appreciates receiving old time radio and wireless QSL cards (originals or copies), photos, postcards, news clippings, station listings, memories, inquiries, and questions. ■

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FCC “Refarming” Q&A

Private Radio Bureau Clarifies Refarming & How It Will Change VHF/UHF

The Private Radio Bureau (Bureau) received many inquiries regarding the Notice of Proposed Rule Making (Notice) in PR Docket No. 92-235, 7 FCC Rcd 8105 (1992). This Notice sets forth a wide variety of proposals on how to more efficiently use spectrum allocated to the private land mobile radio services below 512 MHz.

The current rules governing the use of private land mobile radio spectrum below 512 MHz have been in place for many years. The Notice was issued to solicit comment from all interested parties on proposals designed to improve these rules, to provide additional channel capacity for traditional private land mobile radio users, and to promote more efficient use of these channels. The proposals in the Notice are complex and deserve the fullest attention by all private land mobile radio users. To assist users in understanding these proposals, the Bureau has prepared the attached Question and Answer paper that highlights the most common concerns raised.

The proposals in the Notice represent the agency’s best judgment on steps that can be taken to make more efficient use of the private land mobile radio spectrum below 512 MHz. None of these proposals, however, are cast in concrete, and all concerns will be fully evaluated before final rules are adopted in this important undertaking. The Bureau is looking forward to working with interested parties to develop a regulatory environment that will serve the growing and diverse needs of private radio users in the twenty-four century.

Refarming

Question 1. What is the purpose of the Notice of Proposed Rulemaking (Notice) in PR Docket No, 92-235, 57 FR 54034 (1992)?

Answer. The Notice proposes to promote more efficient use of the frequency bands below 512 MHz used by private land mobile radio systems. These frequency bands are the most heavily used of all allocations of private land mobile radio systems. In many markets the bands are overcongested and, consequently, the quality of communications is very low. Furthermore, the rules governing use of these bands have been developed over a long period of time and are based on yesteryear’s technology. The Notice was issued therefore to find ways to make better use of these bands and to simplify the rules governing their use.

Question 2. Is it absolutely necessary to proceed with the Notice or is it sufficient to continue pursuant to current rules and requirements?

Answer. It is not absolutely necessary to change the current rules and requirements at this time. They will have to be changed at some time, however, and the longer we delay, the more difficult it will become. Spectrum for radio communications is scarce and must be used as efficiently as possible if the nation is to meet its future communications requirements. Spectrum congestion can and has produced tangible problems to public safety and business entities. If we are to provide for the future communications needs of private land mobile radio users, we must devise a plan for meeting the major objectives of the Notice. (See next question)

Question 3. What are the major objectives of the Notice?

Answer. The Notice seeks to (1) increase channel capacity for private land mobile radio users, (2) reduce spectrum congestion in these bands, (3) promote more efficient use of these channels, and (4) simplify the rules governing the use of these bands by authorized users.

Question 4. Would you consider the objectives of the Notice acceptable to private land mobile radio users.

Answer. Generally, the objectives of the Notice seem to be embraced by the majority of private land mobile radio users. There is, however, disagreement on the best method of reaching these objectives. There are many potential paths that could be followed, each of which has advantages and disadvantages. To stimulate valuable debate on how to achieve our objectives, we have proposed one specific method. We have also asked private land mobile radio users to evaluate all aspects of the proposals and to offer any alternatives that they may have on how to achieve the objectives.

Question 5. What are the major proposals set forth in the Notice that are designed to achieve the objectives stated above?

Answer. The Notice proposes a series of major changes. First, we propose spectrum efficiency standards to increase spectrum capacity by 300 to 500 percent. Coupled with this proposal is the time period that will be necessary to convert to the new standards. This issue is, perhaps, the most complex and difficult. Second, while the spectrum below 512 MHz would still be designated as “shared” spectrum, we propose a channel exclusivity option. Third, we propose to consolidate the current twenty radio services into three broad services; and, fourth, we propose new technical and operational standards.

Question 6. What do you mean by creating a spectrum efficiency standard to increase channel capacity?

Answer. Existing private land mobile radio operations below 512 MHz generally occupy 20 kHz of spectrum per channel. Channels are spaced anywhere from 12.5 to 30 kHz apart. If channels are made narrower so that the space between channels can be reduced, additional channels can be created. Thus, we propose that the current spacing be reduced to 12.5 kHz and then 6.25 kHz in some bands and to 5 kHz in some other bands. The overall effect of this proposal would be to create a significant number of new channels for private land mobile radio users. We also propose to permit “stacking” of these new narrow channels (i.e., combining adjacent narrowband channels for use as wideband channels) provided the resulting system will be sufficiently efficient. Thus, while the focus of the Notice appears to be strictly on narrowband channelization, we would permit alternative approaches.

Question 7. How would the transition to the new narrow channels be accomplished?

Answer. The transition to the new narrowband channels is a key issue. The proposal is complex, was difficult to arrive at, and should be the subject of considerable debate. Generally speaking, the Notice proposes that, within a reasonable time period following adoption of the new rules, existing land mobile systems would be required to adjust their transmitters to reduce frequency deviation. It is our understanding, based on comments received during earlier stages of this proceeding, that this should require no change in equipment. Rather, in most cases, this adjustment can be done by a qualified technician with standard measuring devices and a screwdriver. Later, between the years 2004 and 2012, existing systems must fully convert to the final narrowband standards. Alternative plans that meet the objectives of the Notice will be given serious consideration.

Question 8. Would the conversion to the new spectrum efficiency standard obsolete existing equipment before its normal life span?

Answer. We have attempted to craft a set of proposals that would have little adverse impact on existing users. One of the goals of the Notice was to assure existing licensees with both small and large investments in current equipment that they would have sufficient time to amortize that equipment. Apparently, however, there is significant concern by existing licensees that the actions proposed would have an adverse impact on them. Specifically, we have seen claims that a full change-out of equipment will be required to meet our proposed standards for 1996 or earlier. If that claim is proven true, the final rules will be crafted to prevent hardship. We fully understand this concern and would welcome alternative proposals that would promote the objectives of the Notice while minimizing the financial impact.

Question 9. When would new users have to use 6.25 or 5 kHz equipment?

Answer. There are no special bandwidth provisions for new users. They may use the same equipment as existing users, but only current Part 90 frequencies. Alternatively, they may use 6.25 or 5 kHz equipment on any available Part 88 frequency. Thus, for example, in 1996 an applicant for a new system in the 450-470 MHz band could request either a 6.25 kHz or a 12.5 kHz channel. If they want a 12.5 kHz channel, they would be assigned a channel centered at the same frquency as a current Part 90 frequency. If they want a 6.25 kHz channel, then they would be assigned one of the new Part 88 channels. The advantages of using 6.25 kHz equipment are that more such frequencies would be available and that such equipment could be used for an indefinite period of time without modification. One major question to be resolved is whether we should delay licensing on the Part 88 channels to prevent interference to existing users during the transition.

Question 10. What changes would occur in 1994?

Answer. There would be three primary changes. First, the maximum permitted power level for new radio systems would be reduced. Existing systems would not be required to do anything. Second, existing systems could apply for the right to change a shared channel to an exclusive use channel (see Question 12). Third, three broad radio services would be created (see Question 13). In total, the impact of these changes would be primarily long term, and generally costless.

Question 11. Would small users be forced to go to a private or to a common carrier?

Answer. We seek to protect all users, regardless of size. Under our proposal, no user would be forced to move. Furthermore, channels in each band are being set aside for shared use and for low power needs. Thus, there will always be a home for the small user that wants to operate his/her own radio system in a shared environment. In addition, some modest sized users, particularly in rural markets, would be eligible to obtain exclusive use of a channel. In sum, we would not force any user to a private or common carrier and anticipate such movement only if the individual user sees using such carriers as being in their own best interest.

Question 12. Would an existing user be able to obtain exclusive use of a channel already assigned on a shared basis?

Answer. The channels covered by this proceeding are generally shared by many users. Sharing would remain the primary mechanism for these channels. Because shared usage can stifle new technology, however, we propose an option for converting channels between 150 and 470 MHz from shared to exclusive use. This marketplace mechanism is called exclusive use overlay. With an appropriate showing, applicants could request that the Commission stop issuing additional licensees on their channel within 50 miles of the appli-

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cant's base station. This gives the applicant a fixed environment within which to negotiate with co-channel users for exclusive use of the channel.

Question 13. Why has the Commission proposed to consolidate the existing radio services?

Answer. Over many years the Commission has created a number of different radio services composed of like users. Each of these services has been assigned specific channels that are shared by users within that service. When there were few types of users, this system worked well in providing for the communications needs of identified user groups. Today, however, with almost 750,000 licensees, usage of channels assigned to the various radio services has become extremely uneven (i.e., channels in some services are heavily congested while channels in other services are lightly used). Interservice sharing rules have had some limited effect in correcting this uneven usage pattern. To further reduce this problem, we have proposed to consolidate these radio services. Furthermore, the proposed consolidation will allow users to easily aggregate channels to take advantage of newer technologies such as trunking and fast data. To achieve these goals, we are seeking industry guidance on whether and how radio service consolidation should take place.

Question 14. Will the proposed radio service consolidation have an adverse impact on the frequency coordination process?

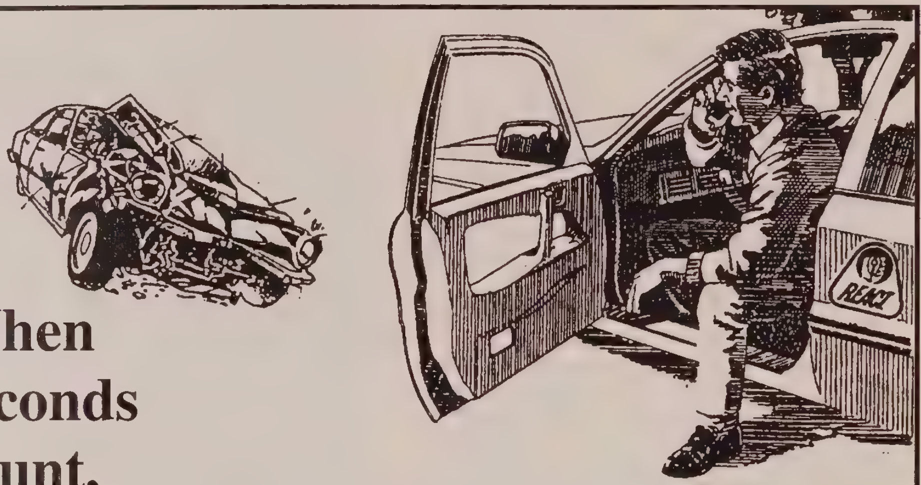
Answer. The current certified frequency coordinators are closely tied to the existing radio services. Even though we have proposed to consolidate these services, we also propose to continue to use frequency coordinators in our licensing process. They will play a vital role in ensuring that the final rules are implemented smoothly. Furthermore, under the proposals set forth in the Notice, each existing coordinator will be able to coordinate a far larger number of channels, and users will have the option of using more than one coordinator to assist in frequency selection and application preparation. Overall, therefore, we believe the proposals will expand the role of coordinators and have a positive impact on the wide variety of users of private land mobile radio spectrum.

Question 15. Have you proposed new mobile loading criteria to govern channel occupancy on the frequencies below 512 megahertz?

Answer. Yes. In most urban markets (other than New York and Los Angeles) and in rural areas, the proposed loading criteria are 50 and 20 mobiles per channel, respectively. In New York and Los Angeles, the proposed loading criterion is 70 mobiles per channel. In addition, we have made a proposal called vertical loading. Vertical loading means that coordinators should make frequency recommendations that meet applicants' need with an eye towards preserving spectrum for future needs. Thus, as today, many small users should expect to share their channel. This policy would not, however, "fill up" every channel, but would instead load up to the proposed loading critera, which are generally considered well below full capacity.

Question 16. What is your proposal concerning maximum permitted power?

Answer. The Communications Act specifically requires that each licensee use the minimum necessary power for each specific communication. Available evidence suggests that many private land mobile users build systems with power levels in excess of any reasonable need. To promote spectrum efficiency, we have proposed a new set of power limitations. The specific limits were modelled on those used successfully for 20 years for the bands above 800 MHz. Reduced power would also generally improve the operating environment for all users, including reducing interference. Finally reduced power may be necessary if we are to permit various technologies, such as trunking and certain digital techniques, as the private land mobile radio industry has urged us to do. Implementing these



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new limits, however, would be difficult. Thus, we are looking for industry input on a number of issues, including provisions for wide area and rural needs, how to transition to these new limits, and on specific technical parameters.

Question 17. What steps are we proposing to meet the special needs of public safety agencies?

Answer. First, we are proposing the creation of the Public Safety Radio Service. This service will ensure that a bank of over 1400 channels is set aside strictly for public safety use. In fact, this is the largest proposed increase in public safety capacity ever. Public safety users would also be eligible for all other private land mobile channels. Second, many of the proposed provisions, for example, the exclusivity, trunking, wide area and slow growth provisions, should be of particular benefit to public safety agencies. Finally, the proposed technical and operational flexibility should eliminate regulatory barriers to technologies, such as ultra fast data, craved by many police departments, emergency medical services, and other public safety agencies. We recognize that public safety agencies have special budgetary and other constraints and look forward to working with such users and their trade groups in striking a balance between the need for additional channels and the need to keep costs under control.

Question 18. Could public safety agencies continue to use mobile relay stations in the 150-174 MHz band?

Answer. Yes. Currently, mobile relay operations are permitted in the 150-174 MHz band, despite the fact that there is no formal pairing of channels in this band. This will not change. Under our proposed rules, all existing mobile relay operations could continue operation indefinitely. Applications for new mobile relay operations would be granted under simple conditions designed to prevent interference problems.

Question 19. Are you taking channels away from any user group?

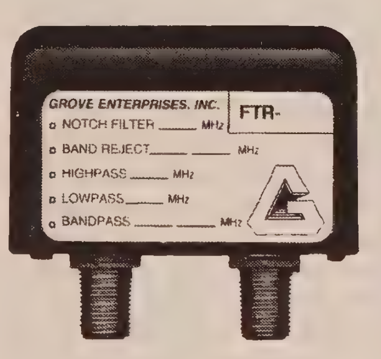
Answer. We have proposed insertion of innovative shared use operations on approximately every third channel between 150 and 162 MHz. We believe that such operations can be extremely spectrum efficient and thus generally reduce spectrum congestion. They would provide an important service to their customers: wide-area coverage. Finally, these users would pioneer techniques and technologies that could be applied by other users.

Question 21. Besides the increase in capacity, what are some of the benefits that could result from these proposals?

Answer. First, we have proposed generally simplifying our operational rules. Second, the channel exclusivity option allows us to propose permitting centralized trunked operations below 800 MHz. Trunked equipment is spectrally efficient and has significant operational advantages for the user. Third, we have tried to make Part 88 more "user friendly" than Part 90. There are several other proposed operational or technical improvements. In sum, we have tried to meet the needs of all user groups, and yet keep things reasonably simple. We recognize that this rule making is complex. We hope, however, that the commenters address not only the big issues such as channel spacing, but also the broad array or lesser issues.

Question 22. Would these proposals displace existing radio control users in the 72-76 MHz band?

Answer. No. Private land mobile, common carrier, and radio control users have peacefuully shared spectrum in this band for many years and this will continue under the proposed 5 kHz channel for low power land mobile users. ■



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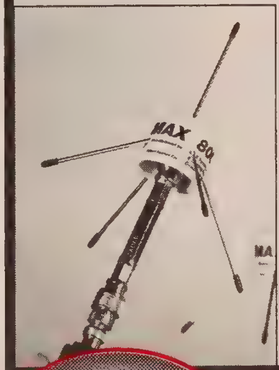

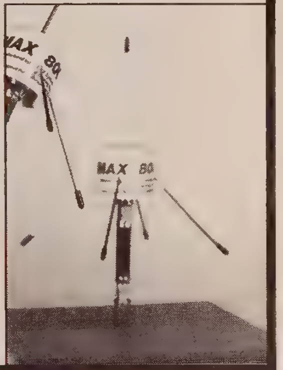

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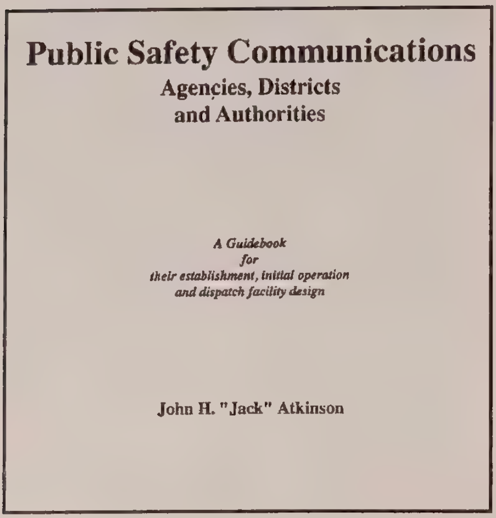

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Jack Atkinson is the General Manager of the Shasta Area Safety Communications Agency, Redding, Calif. His extensive experience includes being the Communications Director for the City of San Jose, likewise for El Dorado and Marin Counties, Calif. He was Director of the Clark Regional Communications Agency, Vancouver, Wash. A mutual friend advises that Jack is also a scanner enthusiast and very nice guy.

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Covert Intelligence: Electronics Eavesdropping Techniques, is an exact and full reprint of the controversial and explicit official US Government manual on using hidden transmitters and telephone taps for intelligence gathering, plus the theory and applications of bugging. A fascinating look at the Fed point of view.

Prepared by the US Dept. of Justice, it was disseminated to all US intelligence gathering agencies. Detailed text is enhanced by charts, tables, graphs, and illustrations. Includes sections on transmitter frequencies; the range of body transmitters ("wires"); detecting persons wearing "wires;" hidden antennas; connecting hardwire telephone tap transmitters; the harmonica bug; eavesdropping receiving techniques; recording of conversations. There are also two useful schematics (not part of the original Fed report) added showing a simple miniature VHF surveillance transmitter and miniature VHF surveillance receiver to detect "wires" and room bugs.

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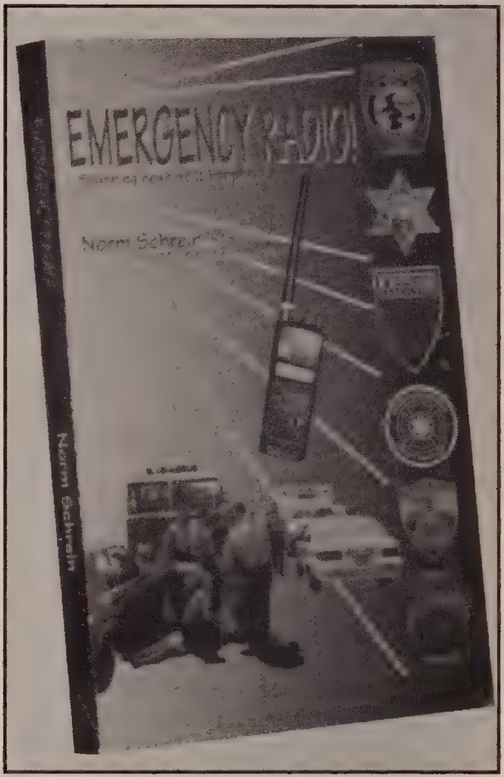
There's a lot of amazing information here. It's all neatly spelled out in exquisite detail, revealing and explaining the now-classic techniques that earned Big Brother an honored spot in the World Class Snooper's Hall of Fame.

Covert Intelligence: Electronic Eavesdropping..., is $9.95, plus $4 shipping ($5 to Canada). NY State residents please include $1.19 tax. Order from CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725. VISA/MC welcomed. Toll-free phone orders: 1-800-656-0056. Canadian/AK/HI phone orders: (516) 543-9169.

Calling All Cars!

Emergency Radio!: Scanning News As It Happens, by Norm Schrein, is a 214-page excursion into the many ways a scanner can be used to allow a person to safely—from a distance—be at the scene of virtually any type of emergency situation.



The information is interestingly presented with photos, in a series of more than 30 chapters. These chapters primarily consist of personal accounts of the ways various scanner owners have actually used their equipment to monitor SWAT comms, EMS rescues, fire services, ham activities, high seas radio, sports events, and other similar. There are close-up looks at several specific public safety agency communications facilities. The author notes that many of the accounts have appeared previously in *National Scanning Report*, and two were in *Monitoring Times*.

Norm Schrein has been a regular on the scanning scene for many years, so this is book is right down his alley. He's done a fine job with *Emergency Radio!*. Good reading with something for everybody.

Emergency Radio is $14.95, plus $3 shipping ($4 to Canada) from Index Publishing, 3368 Governor Drive, Suite 273F, San Diego, CA 92122. Calif. residents add sales tax. VISA/MC/AMEX orders call: 1-800-546-6707. The book is also available through dealers that carry Index books.

Arrrrr! Pirates be Here.

The 6th Edition of the 69-page Zeller/Yoder *Pirate Radio Directory* is upon us. The authors, George Zeller and Andy Yoder, are both known for their expertise on the trends and inner workings in this field.

Learn, via Zeller's lively text, about pirate radio stations and logging them. Find out how to get QSL's from this shady area of shortwave radio. The pirate station di-

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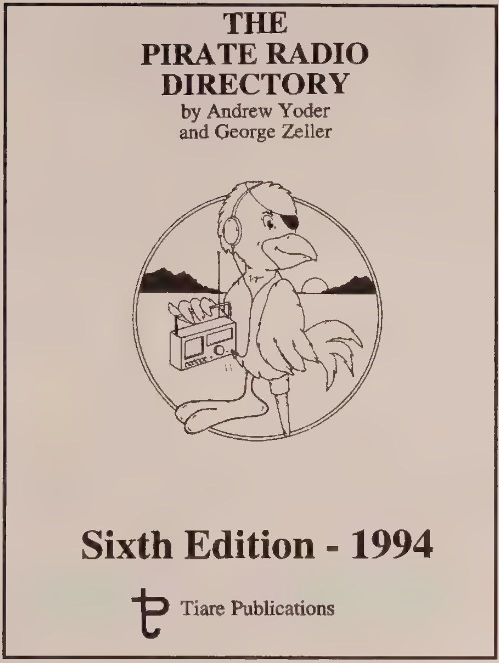

THE
PIRATE RADIO
DIRECTORY
by Andrew Yoder
and George Zeller
Sixth Edition - 1994
Tiare Publications

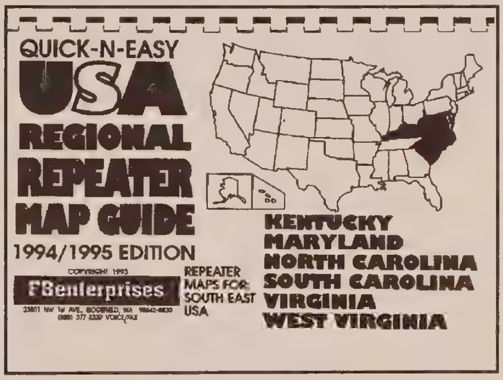
rectory was put together by Yoder. That section reviews the many active pirate stations, providing details of their programming, styles, frequencies, relays, policies, mailing addresses, and other useful information. Finally, there's a helpful historical recap index of all the pirate stations that have appeared in previous editions of this directory series.

If you're interested in pirates, which are among the most unusual stations on the air, this is certainly a unique reference source that has information you will want.

Pirate Radio Directory, 6th Ed., is $12.95, plus $2 shipping ($4 outside USA) from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. VISA/MC are OK. Phone orders: (414) 248-4845.

Would You Repeat That?

The *Quick-N-Easy USA Regional Map Guide* series consists of a compilation of various state outline maps on laminated card stock, each showing the cities where ham repeaters exist. Listings show 2-meter band repeaters in full color on the front of the card, with other repeaters between 220 MHz and 1.2 GHz shown on the back.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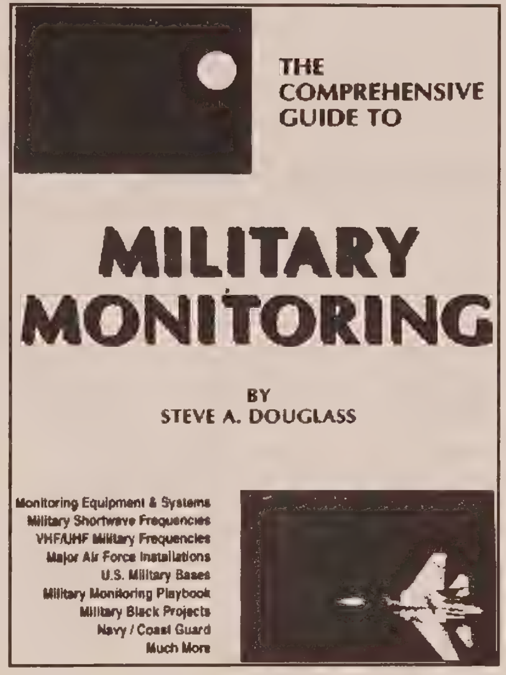
Listings indicate frequencies, plus CTCSS tones and autopatch information as applicable.

All states are covered, and each of the regional directories covers six states. There are 10 different regional directories, which means that some populous in more than one regional directory. Each regional ham repeater directory is $9.95, plus $3 shipping.

Order your own region's directory from FBenterprises, 23801 NW 1st Ave., Ridgefield, WA 98642-8830. Phone orders: 1-800-377-2339.

Military Monitoring

Steve A. Douglass' book, *The Comprehensive Guide to Military Monitoring* allows readers to share in the author's collection of facts and rumors surrounding various secret military projects, especially new aircraft technologies. This includes purported factual information and photos alleged to show the secret "TR-3A Black Manta" plane. It's fascinating, but we have no way of confirming any of this material. The Air Force denies such a plane exists.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BY
STEVE A. DOUGLASS
Monitoring Equipment & Systems
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VHF/UHF Military Frequencies
Major Air Force Installations
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Military Monitoring Playbook
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Navy / Coast Guard
Much More

Douglass also offers information on how to monitor military communications, including a discussion of equipment and a listing of nationwide military frequencies. There's a "milspeak" section showing military lingo. There are also frequency listings for many military bases and facilities, runway maps of some military air bases, as well as channels used for air-to-air refueling. In addition, Douglass provides a listing of US Navy FLTSATCOM channels.

Here's a welcome addition to the reference section of your monitoring information library.

The Comprehensive Guide to Military Monitoring is $19.95, plus $4 shipping from Universal Electronics, Inc., 4555 Groves Rd., Suite 13, Columbus, OH 43232. Phone: (614) 866-4605.

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Scanner Soup-Up Stunts!

Getting More from Your Scanner

BY C.E. RICHMOND, KA5S

Super-receivers like the ICOM R-7000 and Yaesu FRG-9600 have made VHF and UHF scanning more adventurous than it used to be. Listening between the available scanner bands is a whole new hobby in itself. SSB has made Ham satellite transmissions available. But what is a listener to do if he/she doesn't have one of these sets?

Tricks to letting scanners receive frequencies they aren't supposed to have been well convered in these pages and elsewhere. Image reception, mods, keystroke combinations...all of these will serve to expand the bands available. Some scanners do include out-of-band coverage without listing this capability in their specifications. This should however be checked before buying a set because others won't permit entry of frequencies in, say, the 10-meter ham band.

There are ways to soup-up standard scanners! Many listeners are also SWL's or Ham operators. By using another receiver with a scanner, we can realize capabilities not designed into our sets. Bear in mind that they aren't likely to come close to the performance of the sophisticated, multimode scanners.

AM

Several scanners can cover part of the VHF aeronautical band, though they are not designed to. The problem here is that they don't have an AM detector built in, so the recovered audio sounds awful. There's no reason to put up with this, if a receiver that covers the 10-11 MHz or 455 kHz range is available.

What is needed is to couple some of the scanner's IF signals into the second receiver, substituting its detector and audio system for the scanner's. Figure 1 shows the set-up. It shouldn't be necessary to make any changes to either receiver. Simply putting the antenna wire or loopstick close enough to the IF circuits in the scanner should produce plenty of signal. If not, connecting the antenna wire to the scanner's chassis may bring it up.

Using the AM detector, you should be able to get good audio from air-band transmissions. This not only applies to the VHF aero-band. My HX-1000 would "tune" down to 380 MHz, making part of the UHF aero-band available as well.

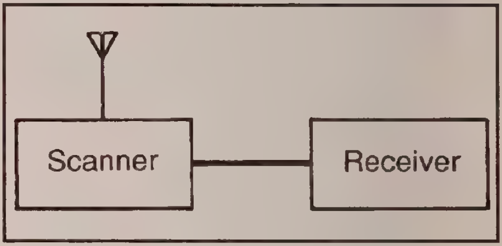


Figure 1 shows the scanner and SWL receiver set-up.

Single Sideband

SSB transmissions can be received by using the SW set's BFO. The set-up of figure 1 is used. When the scanner IF has been found, tune in an SSB signal. Tune for the strongest "quacking." Then, using the SW set's audio and BFO controls, tune in the signal as you would any SSB signal on HF. The signal may be distorted by synthesizer noise, but should be intelligible.

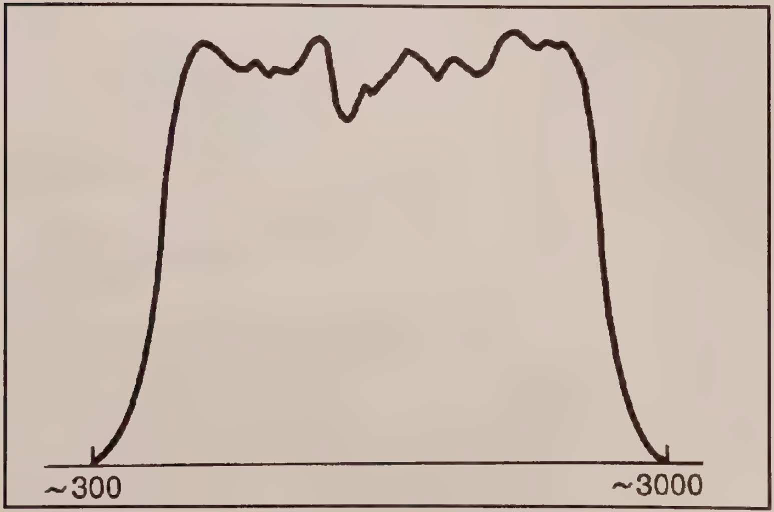
One drawback of this technique is the loss of the squelch function. But since even the expensive sets don't have SSB squelch, this won't make a big difference. By the way, squelch for SSB is available, but requires circuitry that can distinguish between tones, noise, and real voice transmissions. This kind of squelch could be useful for monitoring channels that have a "guard tone."

As an informative technical note, one side effect of the SSB mode is that it can be used to receive speech-inversion scrambling. Reception will not be as good as it would be using a descrambler. However since descramblers are now illegal and BFOs aren't, the capability is interesting.

The way it works is illuminating. A frequency-modulated signal differs from an amplitude-modulated one in that its strength does not vary. This applies to the signal as a whole, measured over its total bandwidth. But even an FM signal can be shown to have amplitude variations. If, for example, a commercial FM broadcaster is received on a narrowband FM receiver, the signal will drop in and out as modulation is applied. Across small bandwidths, the FM signal can "look" like an AM, or an SSB one. If a narrowband FM signal is tuned in using a narrow SSB filter, and a BFO, a signal very much like SSB will be heard. It may be obscured by the shifting carrier, though.

Inverted Speech?

Inverted speech is present in these sidebands as if it were an opposite sideband signal. In other words, tuning in a scrambled transmission could be done by moving away from the carrier frequency and



The Voice Frequency Signal.

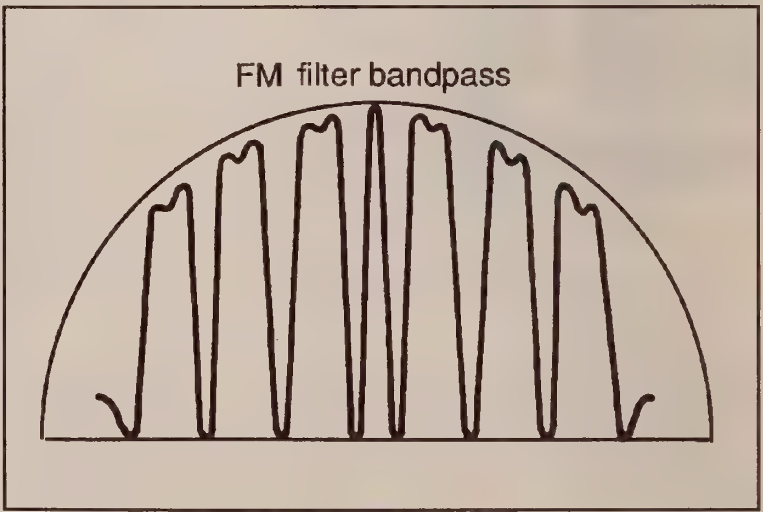


Figure 2. FM signal spectrum showing sidebands

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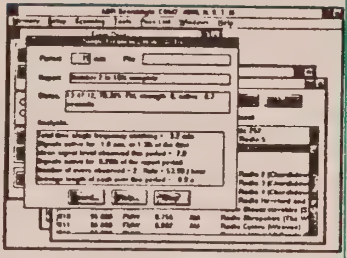
AOR WINDOWS SOFTWARE FOR THE AR3000A

The latest AOR software for IBM and compatible control of the AR3000A, using the computer's RS232 serial port. SEARCHLIGHT makes full use of the Graphical User Interface (GUI) and is a genuine *Windows* program. Uses MDI and CUA (Common User Access) specs for ease of use and a standard "look and feel". DEMO disk is available, running full functions for 10 minute session.



FEATURES: **•Microsoft Windows Program** -foreground and background **•On-line help** -*Windows* hypertext provides info you need, also dialogues have "help" function **•Fully supported*Windows* Sound Recording** -Correctly configured compatible soundcard allows recording from your receiver while scanning or analyzing frequencies. A log contains all the recordings for replay. **•Unlimited number of disk based memory banks** -Each memory banks contains 400 memory channels and can be uploaded or downloaded to and from the receiver. Up to 10 banks may be viewed on-screen at once and an unlimited number may be stored to disk (restricted by your space). **•Copy date to & from clipboard** - Bulk editing and export data base (not supplied) or other *Windows* applications. **•Memory scan and Programmable Band Scan** -Provides a histogram display showing the activity of each channel. Full control is provided including a cursor indicator and sound recording (optional).

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Memories: 100 programmable w/ scan
Modes: AM, LSB, USB,CW, FAX, FMN

Sensitivity:	30-540kHz	540-1800kHz	1.8-30MHz
CW	<1µV*	<5µV*	<.5µV*
SSB	<1µV	<5µV	<.5µV
AM	< 3µV	<15µV	1.5µV
FM	N/A	N/A	.5µV

*Sensitivity improves with optional 500Hz CW Filter.

Selectivity: -6dB: CW, SSB, FAX @ 2.4kHz / AM @6kHz / AMN @2.4kHz / CW @500Hz (opt.)
Tuning Accuracy: 10Hz
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Image & Spurious rejection: >70dB
IF Freq.: 51.655MHz 1st 455kHz 2nd
Dynamic Range: >100dB @ 25kHz spacing
AGC Performance: Threshold 1µV ; Attack 15 mS delay/200mS (fast)/ 3±1 sec (slow); RF Input 1µV-100mV will change audio out <10dB
Ant. inputs: Coax 50Ω unbal., 450Ω bal., Hi-Z for whip
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Power:12VDC -800mA(max.); 8AA Nicad or Alk (not incl.)
Size: 10"W x 3.5"H x 9.5"D; 4.8 lbs.

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Frequency: 100kHz-2036MHz
Mode: USB, LSB, CW, AM, FMN, FMW
Circuitry: Triple (USB/LSB/CW/AM/FMN) and Quadruple (FMW) conversion superheterodyne **Memories:** 400 (4 banks/100 channels)
Scan Rate: 50 ch/sec. **Search Rate:** 50 steps/sec
Sensitivity(µV): 2.5-1800MHz CW, SSB .25/AM1.0/FMN .35/FMW 3.0
Selectivity: SSB,CW 2.4kHz/ AM,FMN 12kHz FMW 180kHz
Power: 13.8VDC, <.5A max audio, AC adapt. incl.
Size: 5.5"W x 3.5"H x 7.9"D; 2.6 lbs.

AR1000XLT

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Features include:

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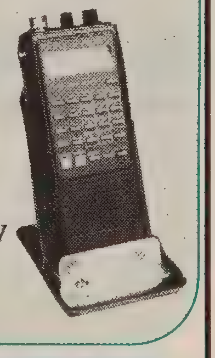
Frequency: .5-1300MHz
Mode: AM, FMN, FMW
Memories: 1000; 10 independant banks
Tuning Steps: 5kHz-995kHz
Attenuator: 10dB (helps prevent overload)
Controls: Key pad and rotary tuning
Sensitivity: FMN <.5µV / FMW <1.0µV / AM <1µV
Power: 12VDC, AC adapt. incl., 4 NiCad incl.
Size: 6.7"W x 1.4"H x 2.6"D; 10 oz.



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changing sidebands in the SW receiver. Figure 2 shows the spectrum relationships that allow this to happen. Actually, with the receiver tuned away from the carrier, SSB reception of an FM signal may be easier than with normal speech, since the warbling, wobbling tone of the carrier is no longer there to distract to listener.

(Some years ago when sideband was first coming into use, the double-sideband mode enjoyed a brief popularity, especially for ham VHF transmitters. Inverted speech was proposed for this scheme, as it made the receiver filter requirements less critical. It was necessary to tune the receiver to a "carrier" frequency some 3 or 4 kHz off of the actual suppressed carrier. The difference in this technique is that the carrier is not suppressed, and the basic mode is not AM, but FM.)

A great deal of patience may be required to get this to work. Straight inverted-speech will still take some tuning, and some of the scrambling techniques use offset "carrier" frequencies. The voice spectrum is frequencies "folded" around an audio signal. It's a simple matter for a user to change frequencies but not to tune them in, especially if short transmissions are (as they should be) the rule. In my area, scrambling is used infrequently, making it more frustrating to zero in on it.

NBVM

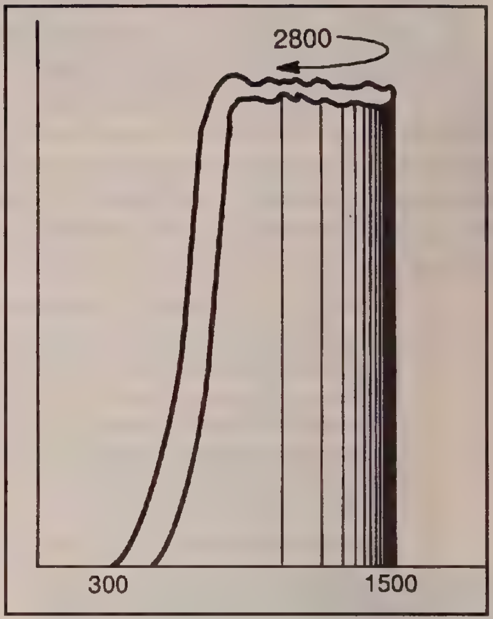
New modulation techniques being brought into use such as NBVM, are relatives of SSB and scrambling. It would be much cheaper to use SSB than NBVM, but NBVM does approach FM's quietness and freedom from flutter while improving the range, although at a much higher cost. NBVM uses spectrum compression and amplitude "companding" to overcome the shortcomings of AM for mobile services.

Normal FM transmissions enjoy remarkable clarity and freedom from flutter because above a threshold level, the receiver limits any amplitude changes, effectively wiping them out. FM requires wide bandwidths to be effective. The narrower the bandwidth used, the closer it comes to AM in behavior. NBVM makes it possible to use narrow (2.5 kHz) channels in place of the 15 and 12.5 kHz channels used by FM.

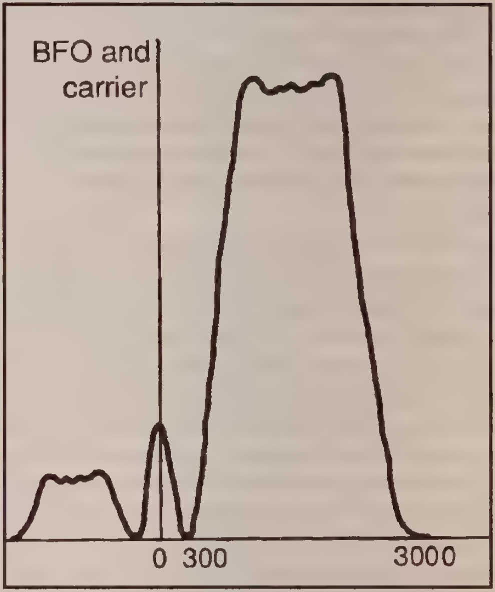
As far as scanner users are concerned, NBVM is like inverted speech. Since we won't be using the speech recovery circuits of the NBVM set, we have to settle for half of the audio signal. This can still work, although voices will sound muffled and be hard to understand. Because several NBVM signals will show up on one old FM channel, though, the tuning technique will have to be modified.

For NBVM, tune in the center of the old FM channel in the scanner. Turn on the BFO in the auxiliary set, and tune in one of the NBVM signals. To receive the neighboring NBVM channels, tune the SW set, *not* the scanner. This may work best if the 10.7 MHz IF is being used instead of 455 kHz, as the extra selectivity in the scanner's second IF may roll off some of the adjacent channels.

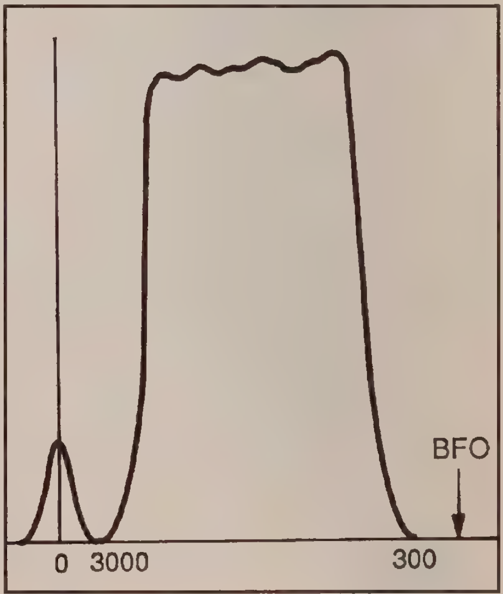
Creative use of available equipment can make our hobby more enjoyable. The feeling of "getting something for nothing" is rewarding enough, but to actually do so is unbelievable. Other combinations are also possible. For example, if you have a scanner that covers your SW receiver's IF such as 55 MHz for the Sony sets, you can use the scanner as an FM detector for SW frequencies extending FM coverage below 30 MHz. What's there? Well, besides the remote pick-up frequencies, there's the Amateur 10-meter FM frequencies from 29.5 to 29.7 MHz, outlaw CB'ers using European FM CB sets, and the occasional Soviet bloc military communications. And if we want to *really* get wild, consider the following (untried) set-up: A scanner at 420 MHz tuning in a Ham TV transmission with a Sony SW set converting it to 55 MHz, and a TV set tuned to channel 2 to pick up the picture. Will it work? Maybe not, but it's fun trying! ■



"Folded" voice signal used in NBVM systems.



Single sideband (USB) signal with suppressed carrier and LSB showing normal (right side up) speech.



A sideband with inverted speech.

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CALIFORNIA, STATE OF	WZR248	42.5400	FB
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CALIFORNIA, STATE OF	KME385	75.7600	FX1
CALIFORNIA, STATE OF	KME385	75.9600	FX1
CALIFORNIA, STATE OF	KSQ945	154.9200	FB
CALIFORNIA, STATE OF	WNBV336	155.4750	FB

800MHz PUBLIC SAFETY

CALIFORNIA, STATE OF	KNBG973	857.7375	FB2
CALIFORNIA, STATE OF	KNEM203	857.9375	FB
CALIFORNIA, STATE OF	WNNS451	858.2625	FB2
CALIFORNIA, STATE OF	WNNS451	859.2625	FB2
CALIFORNIA, STATE OF	WNNS451	860.2625	FB2
CALIFORNIA, STATE OF	KNBG973	860.7375	[illegible]
CALIFORNIA, STATE OF	WPBQ561	867.5375	FB2

FIRE

CALIFORNIA, STATE OF	KPC41	[illegible]	FX1
CALIFORNIA, STATE OF	KPC41	[illegible]	FX1
CALIFORNIA, STATE OF	KQR617	[illegible]	FB2

LOCAL GOVERNMENT

CALIFORNIA, STATE OF	[illegible]	37.2600	FB2
CALIFORNIA, STATE OF	KJS712	153.7550	FB2

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CALIFORNIA, STATE OF	WNJZ478	44.6400	FB2
CALIFORNIA, STATE OF	KWE503	44.8000	FB
CALIFORNIA, STATE OF	KWE503	44.8800	FB
CALIFORNIA, STATE OF	KWE503	44.9600	FX1
CALIFORNIA, STATE OF	KBM647	151.2500	FB2
CALIFORNIA, STATE OF	KBM647	151.3550	FB2
CALIFORNIA, STATE OF	KBM647	151.3850	FB2
CALIFORNIA, STATE OF	WNJZ479	151.4150	FB2
CALIFORNIA, STATE OF	KVY51	159.2700	FX1
CALIFORNIA, STATE OF	KVY51	159.3000	FX1
CALIFORNIA, STATE OF	KVX90	159 3300	FX1
CALIFORNIA, STATE OF	KVY51	159.4050	FX1
CALIFORNIA, STATE OF	WGC761	169.5000	FXO
CALIFORNIA, STATE OF	KOO93	171.9250	FXO

HIGHWAY MAINTENANCE

CALIFORNIA STATE OF	KAE7576	453 8500	FXO
CALIFORNIA, STATE OF	WGU627	47.2000	[illegible]
CALIFORNIA, STATE OF	KXQ825	[illegible]	[illegible]
CALIFORNIA, STATE OF	WPBN772	[illegible]	FXO

COUNTY GOVERNMENT

POLICE

DEL NORTE, COUNTY OF	WCL735	154.8150	FX1

FIRE

DEL NORTE, COUNTY OF	WNMG296	154.0100	FX1
DEL NORTE, COUNTY OF	WNGY257	154.2500	FB
DEL NORTE, COUNTY OF	WNMG296	154.4150	FB2
DEL NORTE, COUNTY OF	WNGY257	154.4450	FB

LOCAL GOVERNMENT

DEL NORTE, COUNTY OF	WNGN647	39.8200	FB
DEL NORTE, COUNTY OF	KSS224	153.9800	FB2
DEL NORTE, COUNTY OF	WXM691	154.0850	FB
DEL NORTE, COUNTY OF	WGP60	155.0850	MO1

SPECIAL EMERGENCY

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DEL NORTE, COUNTY OF	KIB954	463.0000	FB
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DEL NORTE, COUNTY OF	KIB954	463.0500	FB
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DEL NORTE, COUNTY OF	KIB954	463.1000	FB
DEL NORTE, COUNTY OF	KIB954	463.1250	FB
DEL NORTE, COUNTY OF	KIB954	463.1500	FB
DEL NORTE, COUNTY OF	KIB954	463.1750	FB

HIGHWAY MAINTENANCE

DEL NORTE, COUNTY OF	WZJ219	156.2400	FB2
DEL NORTE, COUNTY OF	KA48363	159.0150	MO

CRESCENT CITY

FIRE

CRESCENT FIRE PROTEC	WNKJ623	154.2500	FB
CRESCENT FIRE PROTEC	WNKJ623	154.2800	MO
CRESCENT FIRE PROTEC	WNKJ623	154.4450	FB

LOCAL GOVERNMENT

CRESCENT CITY, CITY OF	[illegible]	156.0000	FB

SPECIAL EMERGENCY

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DEL NORTE AMBULANCE INC	KD20629	150.7750	MO3
DEL NORTE AMBULANCE INC	WPCH896	155.1750	FB
DEL NORTE UNIFIED SCHOOL DIS	WNYW708	155.2800	FB
SUTTER COAST HOSPITA	WNQD425	155.2350	FB
SUTTER COAST HOSPITA	KNDV810	463.0000	FB
SUTTER COAST HOSPITA	KNDV810	463.0250	FB
SUTTER COAST HOSPITA	KNDV810	463.0500	FB
SUTTER COAST HOSPITA	KNDV810	463.0750	FB
SUTTER COAST HOSPITA	KNDV810	463.1000	FB
SUTTER COAST HOSPITA	KNDV810	463.1250	FB
SUTTER COAST HOSPITA	KNDV810	463.1500	FB
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FIRE

KLAMATH FIRE PROTECTION DIST	KNAI398	153.7700	FB

SMITH RIVER

FIRE

SMITH RIVER FIRE PROTECTION	KJS725	154.2500	FB

MISCELLANEOUS

AF	AERONAUTICAL RADIO INC	WCE8	130.2500	FA
AF	AERONAUTICAL RADIO INC	WGH3	129 1500	FA
MC	ALIOTO FISH CO INC	WHU796	156.9000	FC
IB	AMERICAN DETENTION SERVICES	WNMQ243	151.7150	FB
IB	ARCATA REDWOOD CO	WRI901	154.5400	FB
IF	ARCATA REDWOOD COMPANY	KMB577	48.6400	FX1
IF	ARCATA REDWOOD COMPANY	KMB577	49.1200	MO
IF	ARCATA REDWOOD COMPANY	KMB577	49.2000	FB2
IF	ARCATA REDWOOD COMPANY	KMB577	451.7125	MO
IF	ARCATA REDWOOD COMPANY	KMB577	456 7125	MO
IF	BAKER CHOPPING	KAE7576	153.3950	MO
IF	BAKER, GALE	KD22580	153 3950	MO
BA	BER-TEC BROADCASTING INC.	WLP746	947 8750	FX
BA	BER-TEC BROADCASTING INC.	WLP746	948 1250	FX
IF	BETTENDORF TRUCKING	WNQC676	153.2750	FB4
IF	BETTENDORF TRUCKING	WNQC676	158 4150	FX1
IF	BETTENDORF TRUCKING	WNQC676	159.5100	FX1
IB	BLISS, ROBERT M:BLISS, DOROT	WNNR994	151.8650	FB
IW	BLUE STAR GAS CO	KIX951	158 1600	FB
IF	BROWN, RICHARD	WNRL805	153.2000	FB
IB	C & C EXCAVATING	WNMU400	461.6750	FB

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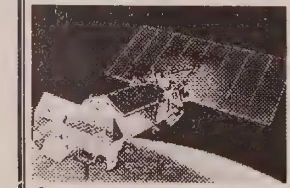

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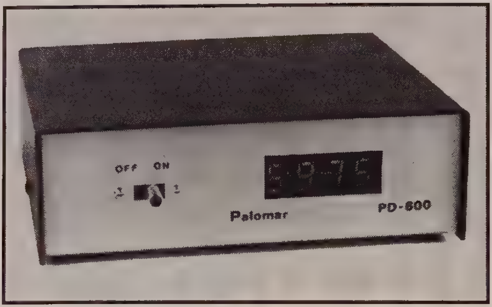
NEW PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Digital Frequency Readout

Palomar Engineers announces a new digital frequency readout for classic receivers. It works with Hallicrafters, Hammarlund, National, RCA, RME, and most other older radios.

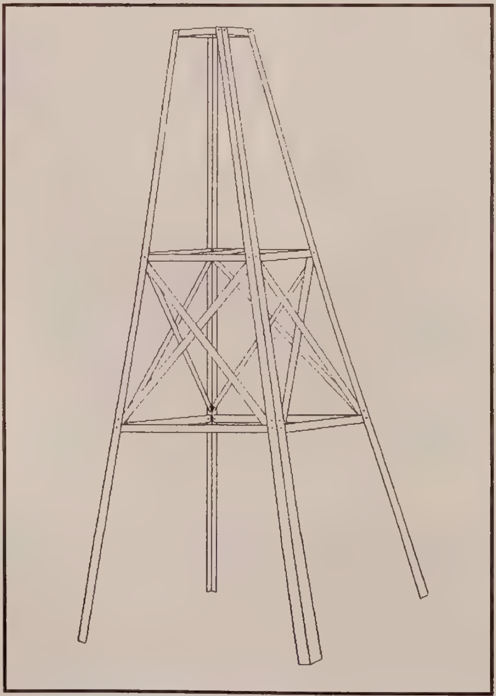
Many of these receivers are still in use. They have good audio quality and work fine for shortwave listening. Their only drawback is poor dial accuracy, making it hard to find a desired station.

Palomar's new PD-600 adds frequency readout accurate to 1 kHz on a four digit bright red display. No modification of the radio is needed; just wrap a wire around an oscillator lead. The readout is adjustable for any receiver intermediate frequency. The price is $199.95.

For further information contact Palomar Engineers, P.O. Box 462222, Escondido, CA 92029. Telephone (619) 747-3343, FAX (619) 747-3346, or circle 101 on our Readers' Service.

Two Roof-Top Towers

The manufacturer of the Hazer antenna tram system adds two roof towers to its aluminum antenna support line.



The premier model is the RT-936, a nine-foot four-leg tower capable of mounting up to 28 square feet of wind load. This tower weighs just 78 pounds and is U.P.S. shippable in two cartons. The cost is $378.75. The lighter model is the RT-832, weighting only 37 pounds. This four-leg tower stands eight feet tall, and will support wind loads of up to eight square feet. This tower is also U.P.S. shippable, and costs $189.95. Both towers come complete with rotator mounting supports and a top plate stamped for direct thrust bearing bolt-up. The towers are constructed of rugged 6061-T6 angle aluminum with stainless steel hardware.

For more information on Glen Martin Engineering products, write at Route 3, Box 322, Boonville, MO 65233, call (816) 882-2734, or circle 102 on our Readers' Service.

Twelve-Channel Logging Recorder

Time Line Technologies, Inc., of New Rochelle, NY, introduces the Maxicord 1225, the first 12 channel, 25 hour, VHS cassette logging recorder for the budget minded buyer.

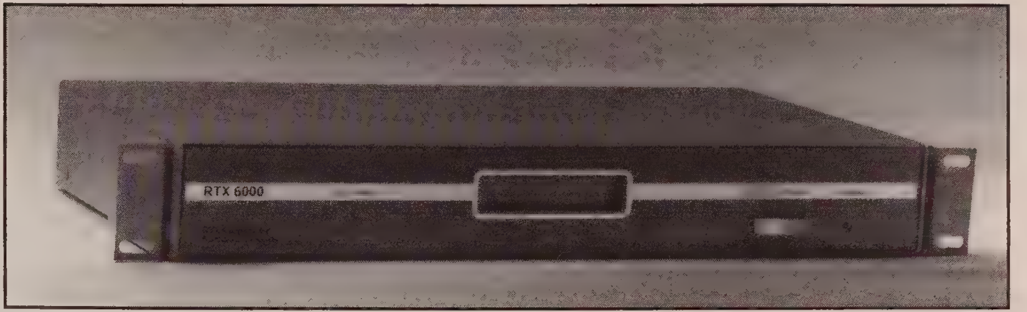
The Maxicord 1225 records up to 12 independent audio lines simultaneously for 25 hours at a fraction of the price of machines presently on the market—a price that will finally put multi-channel logging recording within the budget of the small to mid-size business.

Maxicord 1225 is simple to operate. Just pop in a standard VHS tape and push a button to begin recording. Operation is simple, and the cost and storage of the tapes are economical and easy. Maxicord's linear tracking technology eliminates the expensive aggravation of replacing tapeheads regularly, a significant drawback to helical scan machines on the market.

Maxicord 1225 is built in the U.S.A. to industrial standards, and superior electronics assures a high quality sound letting you hear exactly what was said every time. It has an all-steel case and superior design fitting into your office setting.

Maxicord 1225 is rack mountable, and can be customized to meet specific logging recording needs.

For further information contact Warren Heneberry, president of Time Line Technologies, Inc., 271 North Avenue, New Rochelle, NY 10801. Phone (914) 566-1843, or circle 103 on our Readers' Service.



Radio-Telephone System Controller

RTX Corp. announces the availability of its RTX 6000 microprocessor-driven programmable controller.

The RTX 6000 is a repeater controller that enables mobile radios to be linked to local telephone exchanges so that mobile radio operators can make local, national, and international telephone calls using standard two-way radio equipment.

The RTX 6000 controller is useful to operators of mobile-telephone systems, two-way radio dispatch systems, and paging systems.

RTX 6000 radio-telephone systems provide total user flexibility, offering mobile-to-telephone, telephone-to-mobile, and mobile-to-mobile operation for individual and group calling, plus telephone-to-pager and mobile-to-pager service for up to 1000 mobile telephone users and 1000 pagers.

A unique conferencing feature allows telephone calls to be added to mobile-to-mobile calls already in progress. Service can be mixed for half-duplex, full-duplex, and paging on a user-by-user basis.

The RTX system is analogous to an office PABX telephone system. Each mobile radio-telephone functions as an extension, while the RTX 6000 controller serves as the link to the central office and between the various extensions.

The controller features RTX Corp.'s state-of-the-art signaling technology, which has become the defacto industry standard in UHF and VHF trunking radio-telephone systems.

RTX 6000 controllers are easy to install and adjust. All that is required are standard two-way radio shop tools and materials. The adjustment procedure is straight-forward and easy to follow. A programmer module and a local speaker are included to make it easier for the technician to align and adjust the unit. Also included are the brackets and hardware for mounting the controller in a 19-inch rack.

Additional information on the RTX 6000 controller is available from RTX Corp., 4000 Dow Road, Melbourne, FL 32934. Telephone 1-800-848-4RTX. In Florida, (407) 254-0025, or circle 104 on our Readers' Service. ■

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LOWE HF150 COMPACT SHORTWAVE RECEIVER

The LOWE HF150 has proved to be one of the most popular HF receivers ever made! These compact, world-class receivers combine top-drawer performance with ease of use. Don't let the size fool you! These little radios are superbly crafted in England and offer tremendous value for the money! Owners just love 'em! Many experienced, long-time SWL's say the LOWE HF150 is the best receiver they've ever used!

✦ All band coverage: 30KHz to 30MHz cont.
✦ Multimode: AM, AMN, AM SYNCHRO USB, LSB, CW
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✦ Tuning step: A super fine 8Hz!
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✦ Built-in speaker, external speaker jack, record out jack.
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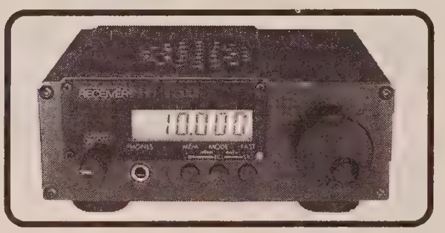
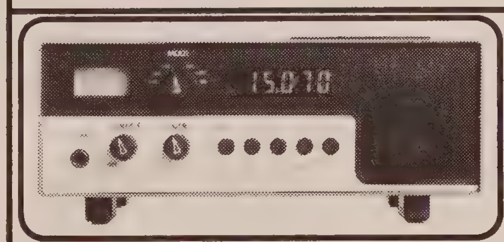
✦ Light, Compact, all metal alloy case!
✦ A full range of hi-tech HF150 acc. avail.



PR150 Receiver and Preselector

Also available: The new matching PR150 pre-selector unit! While styled to perfectly match the HF150, this excellent unit is equally at home (and equally effective) with any other quality shortwave receiver! Seven HI-Q, tunable bandpass filters or straight thru 'wideband' mode. Pre-amp and attenuator functions. Multiple antenna inputs and much more! Hear what you've been missing with the LOWE PR150 preselector.

PR-150
PRE-SELECTOR



LOWE HF225 DESKTOP SHORTWAVE RECEIVER

Now, for those of you who prefer more 'bells and whistles' but demand the same great performance of the popular HF150 provides, and more, LOWE offers its larger, desktop-sized, HF225 shortwave receiver. All the features of the HF150 and more!

This receiver is no lightweight! It has been "WRTH's", "Receiver of the Year" and was rated "4 stars" by "Passport to World Band Radio's" Larry Magne! A serious, full featured HF receiver for serious listening - the LOWE HF225!

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CB SCENE

BY BILL SANDERS, SSB-295

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Cobra has been serving the CB'er for more than 30 years, remaining staunchly loyal to our market. They were in CB before the CB "fad years" of the 1970's, and stuck with CB when many other manufacturers moved on to other interests after the boom times were over. They make fine products, and we are always pleased to let our readers know about their CB radios.

Cobra's *18 ULTRA WeatherBand CB* is one in a series of radios. These are compact mobile radios appealling to travelers who want an extra measure of security while on the road, as well as to existing CB'ers who are upgrading or adding an extra radio. Cobra reminds motorists that CB's are an economical highway safety alternative to costly cellphone service. For instance, CB has no air time charges, roamer charges, toll charges, or monthly service costs.

The *18 ULTRA WeatherBand CB* provides a full-featured transceiver with a front-firing speaker, instant Channel 9 access, and a built-in NOAA weather receiver. There's a large green LED channel display, electronic tuning, front panel mic connector, ANL, and channel saver. Cobra says it's an all-in-one "travelers information center." This radio sells for less than $80.

Look for this radio being offered by your favorite Cobra dealer. For more information, contact Cobra Electronics Corporation, 6500 West Cortland St., Chicago, IL 60635. You can also phone 1-800-COBRA-22, or circle 105 on our Readers' Service.

Cobra's 18 Ultra CB is a multi-featured radio in a small package.

CB'ers Played Role During Quake

In the aftermath of the earthquake that left southern California residents devastated, the REACT team from San Antonio, Texas, responded immediately by outfitting relief trucks with CB equipment and heading west. The equipment was donated by K40 Electronics, of Elgin, Ill.

Within days of the quake, a total of 23 relief trucks (12 of which were packed with K40 CB gear) were loaded-up and dispatched to the stricken area. Disaster response and supply trucks were furnished by San Antonio REACT and the American Red Cross.

Trucks were equipped with K40 mobile CB's with adapters and mag mount CB antennas. The project was a combined effort of K40 Electronics, REACT International, Inc., and the American Red Cross. The goal was for these organizations to assist local authorities in the rescue of victims, and to offer whatever help was possible in stabilizing the emergency situation.

Well done! Quake victims were helped. As a secondary benefit, CB'ers again proved that we are members of a group ready and willing to be of genuine service to the community at large.

Dept. of Federal No-No's

The FCC office in Vero Beach, Fla., issued fines to three area CB operators (Melbourne, Fla.) for using linear amplifiers. One operator was zinged for $1,000, another for $1,500, and the third for a withering $4,000. That $4,000 guy must have been pushing *beaucoup* heat to ring up that many greenstamps.

A letter from reader Douglas H. Stingley, of Salem, Oregon, mentions that in a recent issue we listed several equipment dealers heavily fined for selling illegal CB linear amplifiers. One of those dealers is in his region and was listed as being smacked with a $14,000 fine. Doug points out, however, that the company in question deals exclusively in linears and other illegal equipment, and is known only by means of cheaply printed flyers handed out at three truck stops in the Salem-Portland I-5 corridor. A good guess is many of the other so-called "CB dealers" also tagged with large fines are similar seedy enterprises often operated out of vans and the trunks of cars. These fines, therefore, shouldn't reflect on the many legitimate CB dealers. Good point, Doug.

Local "Nooz" from Here & There

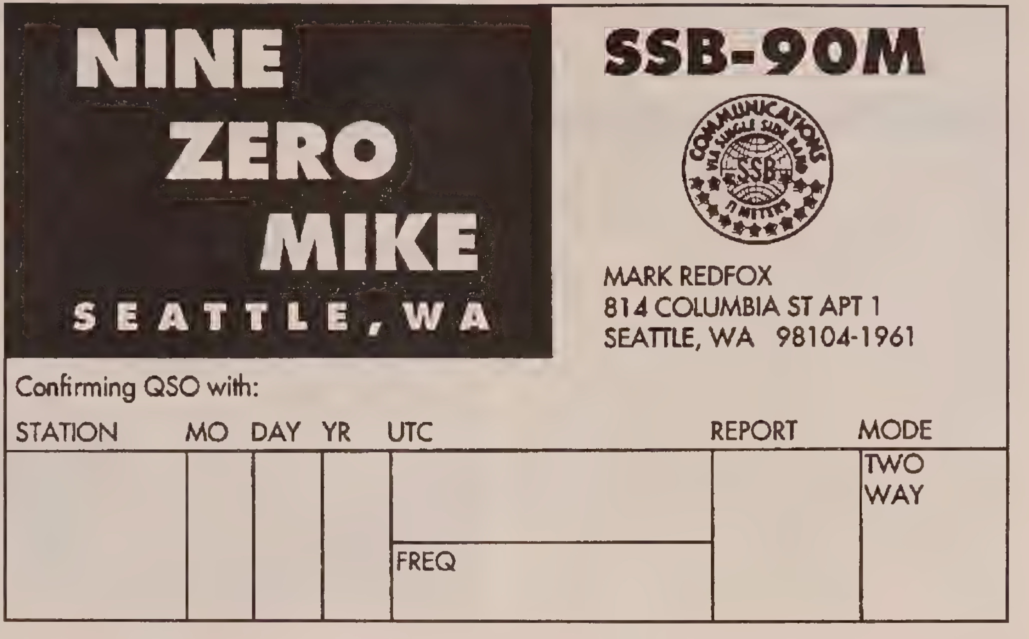
King's Kid Radio Club has about 112 members, even though it is still relatively new. Members are located in several states and in 12 other nations. The group has meetings on the second Sunday of every month. Membership is free. This information came in from Tiny Brown, Secretary,

REACT volunteers from across the USA, including San Antonio REACT, pitched in to dispatch dozens of relief trucks to aid victims of the California quake. Their efforts were aided by equipment supplied by K40 Electronics.

King's Kid Radio Club, P.O. Box 2172, Alma, AR 72921.

The busy AM channels around Hudson, N.Y., are 8, 14, and 30. Truckers operate on 19 and 35. This came from Dany Clum, R.D. 4, Box 34c, Hudson, NY 12534. Dany also wrote that he would like to swap QSL's.

A Radio Shack TRC-492 now adorns the desk of Robert Scott, 2567 N. 57th St., Milwaukee, WI 53210-2207. He's been a *POP'COMM* reader for more than ten years, but is primarily involved with scanners. Thanks to this column, Bob's interest in CB was sparked. Bob wants to know if there a general-information book on CB installation, operation, antennas, SSB, using equipment, and what the hobby is all about. We suggest *Tomcat's Big CB Handbook*, by Tom Kneitel. This 220-page illustrated book has just about everything, and is one of the most popular CB manuals ever written. The book is $13.95, plus $4 shipping ($5 to Canada), from CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725. Phone orders: 1-800-656-0056; phone orders from Canada, AK, and HI: (516) 543-9169.



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STATION	MO	DAY	YR	UTC	REPORT	MODE
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SSB Network member SSB-90M is Mark Redfox, who sends out these bold QSL's.

No-Look Sky-Hook

Mark Redfox, SSB Network Member SSB-90M, and Registered Monitor KWA7DQ, of Seattle, Wash., is into scanners and CB radio. A full-blood Lakota Sioux, he is a professional artist. We have seen some of Mark's artwork, which has a Sioux theme. It's really great.

Not long ago, Mark moved from third floor digs into a basement apartment where the landlord doesn't allow base station antennas to be installed. Mark asks if we can provide any suggestions for successful base operation under these conditions.

An idea passed along to me several years ago, second hand, by a very savvy CB'er might be just the ticket here. It's a decent temporary base station antenna that can be put up and taken down for use only when it's needed. Even the most cold-hearted landlord who won't allow the installation of a permanent base station antenna, may be convinced to permit the use of this for a certain agreed-upon amount of time each day or week (or during specific hours). It doesn't attach to the building, itself. Also, the whole thing completely vanishes in a

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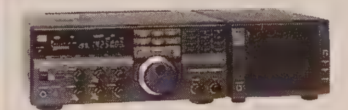

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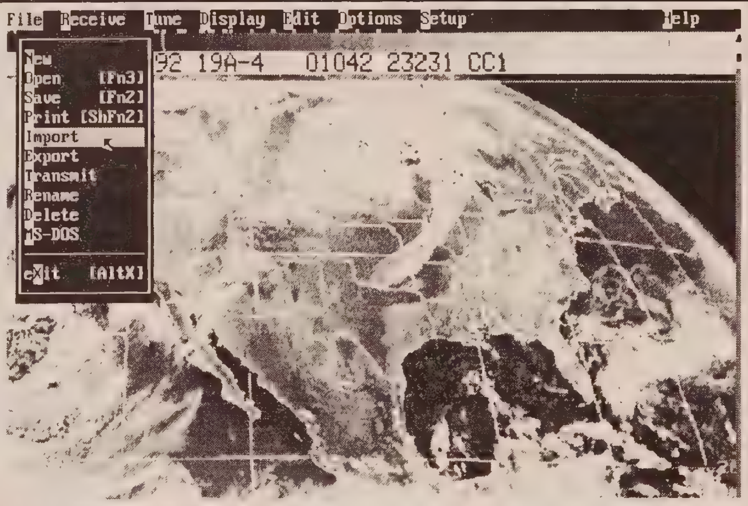

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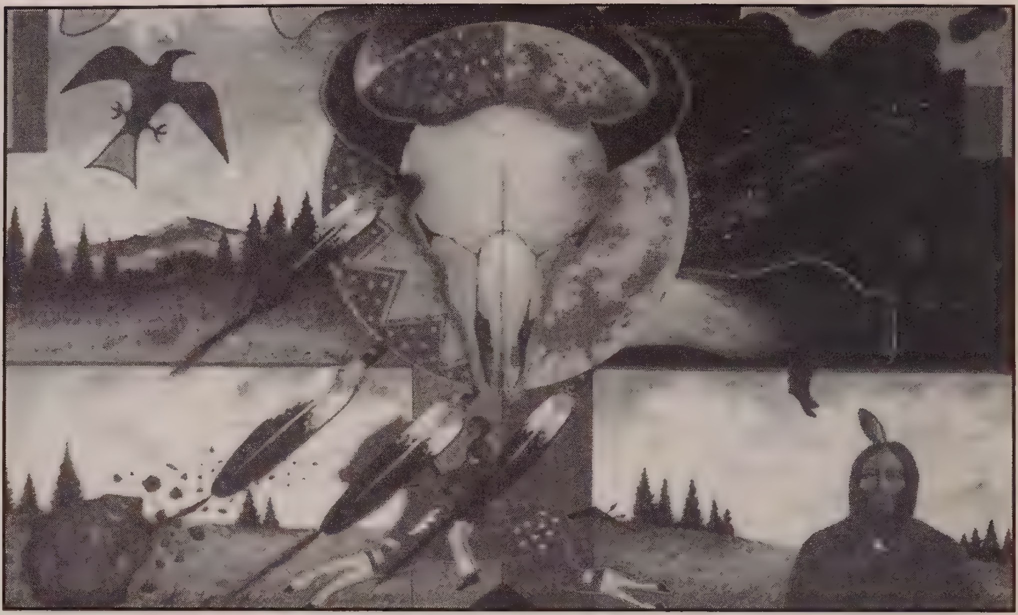
CIRCLE 88 ON READER SERVICE CARD

few minutes when its not in use.



On the flip side of SSB-90M's QSL card is a reproduction of one of Mark's dramatic Lakota Sioux theme paintings. Wish we could show it to you in the blazing colors appearing on the QSL itself. This beautiful card's a keeper, fer sure!

What this consists of is a Fiberglass omnidirectional vertical, such as a *Big Stick*. The *Big Stick*, for instance, is a two-section job that comes apart at the center. For starters, install a mobile quick-disconnect gizmo between the upper and lower portions of the *Big Stick*. That makes joining and disassembly a cinch.

Then, attach the *Big Stick* to short length of tubular masting, using a couple of U-bolts clamped to the base of the antenna. The masting can then be placed in a movable cement base designed for supporting a lawn umbrella. This cement footing will easily and securely support the antenna. Be sure to place the antenna clear of the building structure. It is also *very important* that deliberate care be taken to place this (or any) antenna far away from all electric power lines. Power lines pose a life-threatening hazard should an antenna accidentally come into contact with them.

When the antenna is in place, a length of RG-58/U feedline can be attached to its base via standard PL-259, then snaked through the basement window to the CB radio. If the addition of the quick-disconnect has detuned the antenna to the point where the SWR has come up higher than you want, the match can be improved with an inexpensive CB antenna matcher.

This antenna can be put up in minutes, and dismantled just as quickly. Best of all, it does a decent job on the band given that it isn't roof-mounted. If the length of the masting isn't too long, the whole thing can be stored in back of a couch or in a closet. If a single-section antenna (such as the Radio Shack *Crossbow*, or similar type), or a long section of masting is used, the thing may be too big to stash in the apartment. In that case, the landlord might be willing to allow the antenna's inconspicuous storage flat on the ground along the side of the building, or in the garage.

If the landlord refuses the request to allow this for a few hours per week, "Plan B" consists of offering to pay a few dollars extra rent for the privilege of using the antenna for a specific number of hours.

We'll be standing by on the side until next time. Let us hear from you with your CB QSL's, station photos, questions, CB news, ideas, opinions, and thoughts. ■

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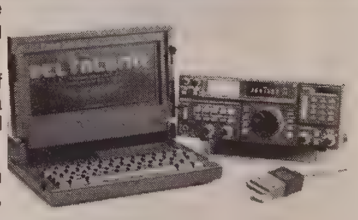

- CYBERSCAN function allows scan file tracking control of systems employing frequency hopping techniques.
- Spectrum log at speeds in excess of 1300 channels a minute, generate a real time histogram of activity and create scan database file automatically.
- Birdie log during frequency search automatically characterizes your R7000, then locks out those frequencies.
- Activity log function continuously monitors and logs all frequencies of a scan database while displaying active, was active and never active channels.

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- DSS allows user programmable upper and/or lower signal level detection limits during DELTACOMM™ I-7000's spectrum log, scan and search functions.
- Log signal strength information to printer or delimited log file while DELTACOMM™ I-7000 is scanning or activity logging the selected database file.

DELTACOMM™ I-7000 communication manager program includes all cabling, manual, UL listed power supply and Delta Research custom CI-V interface for $299.00 + $8.00 (U.S.) or $25.00 (foreign) S&H. The DELTACOMM™ DSS interface upgrade comes complete with easy to follow NO SOLDER installation instructions, all cabling and 8-bit DSS A/D converter module (game port required) for $99.00 + $8.00 (U.S.) or $25.00 (foreign) S&H and is available as an upgrade option to registered I-7000 users. Contact us for additional information on DELTACOMM™ communication managers for ICOM™ R7100, R71A, R72 and IC735.

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CIRCLE 64 ON READER SERVICE CARD

BROADCAST DX'ING

BY ROGER STERCKX, KVT1JH

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

Cincinnati Changes: In Ohio, some new looks have come about on the Cincinnati broadcasting bands. According to a story by Greg Paeth in *The Cincinnati Post*, WLWA (ex-WKRC) is gone from 550 kHz and in its place came a hybrid of WLWA and WCKY (AM) with a talk-radio format using the WCKY call letters. WIMJ-FM is history and was replaced by rock oldies station WPPT-FM, which has a different playlist than rocker WEBN. WSAI moved from 1360 to 1530 kHz, and runs a big band format geared towards an older audience. The former WSAI 1360 kHz channel emerged as WAQZ with a children's format. This information passed along by King C. Harrison, of Cincinnati.

From Big D: Old timer KRLD/1080, Dallas' 50 kW all-news radio giant, has changed to a talk format between 9 a.m. and 3 p.m. While the station will still continue to have regular news, weather, business updates and traffic breaks during these hours, the major programming will be centered around lively topical discussions that invite listeners to call in. Thanks to readers Bill Rich, of Fort Worth, and Larry Pullin, of Ardmore, Okla., for this information.

Good News From Music City: WNQM/

Requested Changed AM Facilities

KCBN	Reno, NV	1230 kHz	Seeks drop to 820 watt.
WCBX	Bassett, VA	900 kHz	Seeks night drop to 180 watts.
WEEN	Lafatette, TN	1460 kHz	Seeks drop to 860/119 watts.
WINE	Brookfield, CT	940 kHz	Seeks daytime drop to 680 watts.

Changed AM Facilities

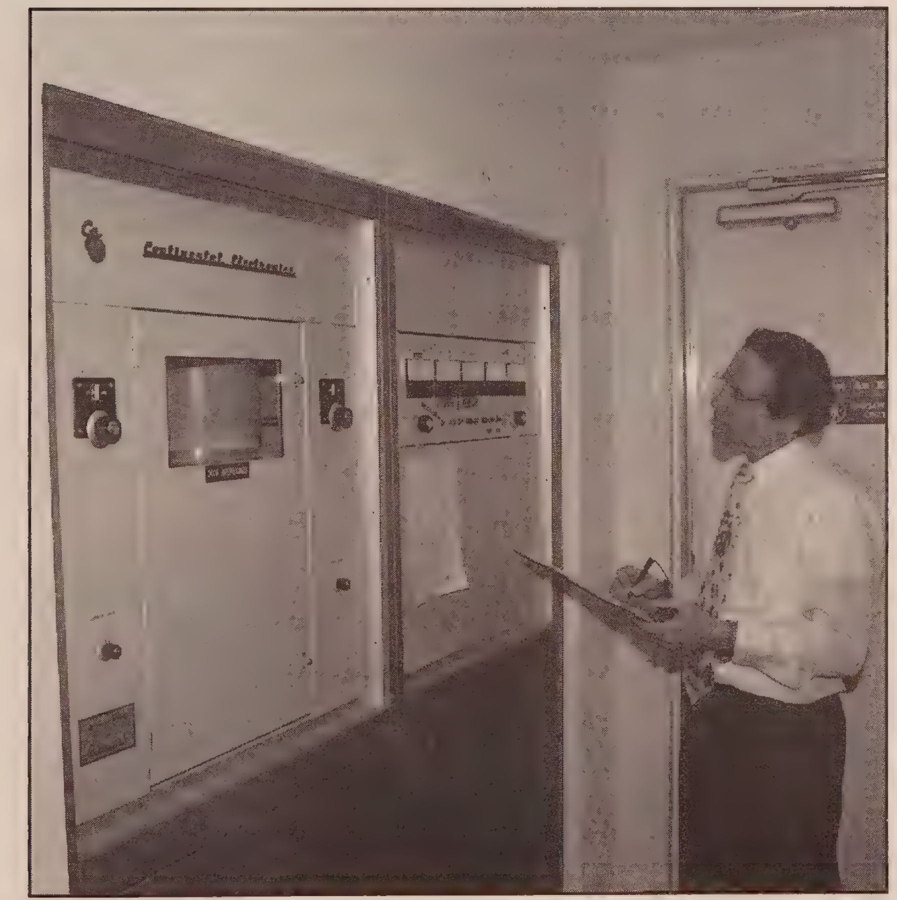
KAGH	Crossett, AR	800 kHz	Dropped to 240 watts.
KRLL	Albuquerque, NM	1580 kHz	Dropped days to 5 kW.
WBMA	Dedham, MA	890 kHz	Increased to 25/3.5 kW.
WCXQ	Moca, PR	1040 kHz	Increased days to 5 kW.
WKYD	Andalusia, AL	920 kHz	Dropped nights to 40 watts.
WXAL	Demopolis, AL	1400 kHz	Dropped to 790 watts.

Requesting Changed AM Facilities

WSHV	South Hill, VA	105.5 MHz	Seeks move to 98.9 MHz, 15 kW.
WVHF-FM	Clarksburg, WI	92.7 MHz	Seeks move to 92.1 MHz, 1.3 kW.

Changed FM Facilities

KILO	Colorado Springs, CO	93.9 MHz	Moved to 94.3 MHz.
KZCD	Lawton, OK	94.1 MHz	Moved to 94.3 MHz, 50 kW.
WERB	Berlin, CT	103.5 MHz	Moved to 94.5 MHz.
WPLH	Trifton, GA	102.9 MHz	Moved to 102.5 MHz, low power.
WQUL	Griffin, GA	97.7 MHz	Moved to Fayetteville, 97.5 MHz, 8.5 kW.
WQYX	Clearfield, PA	93.5 MHz	Moved to 93.1, 1.7 kW.
WYKS	Gainesville, FL	105.5 MHz	Moved to 105.3 MHz, 6 kW.



George McClintock, General Manager of WNQM, checks the new 10 kW transmitter.

Pending AM Call Letter Changes

Now	Seeks	
KAPL	KWRN	Apple Valley, CA
WCKN	WIBJ	Indianapolis, IN

Changed AM Call Letters

New	Was	
KCTE	KJLA	Independence, MO
KDWG	KCTR	Billings, MT
KENR	KRBE	Houston, TX
KIOQ	KKSA	Folsom, CA
KKBK	KMUZ	Gresham, OR
KLLZ	KLLR	Walker, MN
KREH	KICR	Oakdale, LA
KSDT	KHSJ	Hemet, CA
KSYG	KBIS	Little Rock, AR
WAVP	WKHF	San Francisco, CA
WDAK	WSTH	Columbus, GA
WDJL	WTAK	Huntsville, AL
WGGG	WFTP	Gainesville, FL
WJGR	WQIK	Jacksonville, FL
WLMC	WVBX	Georgetown, SC
WLOL	KBCW	Brooklyn Park, MN
WRFS	WTLM	Alexander City, AL
WSPQ	WFWC	Keyser, WV
WTMQ	WHYD	Jackson, MI
WWZD	WPMX	New Albany, MS
WYTA	WRFA	Largo, FL
WZEZ	WEZK	Knoxville, TN

Pending FM Call Letter Changes

Now	Seeks	
KCVS	KZBZ	Salina, KS
KQMN	KXXI	Gallup, NM
WOEZ-FM	WVLY	Milton, PA
WSHQ	WQBJ	Cobbleskill, NY
WXGL-FM	WKFM	Lewiston, ME

1300, of Nashville, Tenn., doubled its daytime power from 5 kW to 10 kW, non-directional. At night, WNQM operates with 5 kW with five towers. WNQM airs more than 80 religious programs during its broadcast week. The current owner, F.W. Robbert Broadcasting Co., purchased the station in 1980. WNQM is co-owned with well-known 100 kW shortwave broadcaster WWCR, which is operated from the same Nashville facilities.

WNQM is the first Class 3 station to increase power from the FCC's 5 kW power maximum. Rules recently changed to allow expansion to higher power levels. We appreciate this information from our friend, *POP'COMM* reader George McClintock, General Manager of WNQM/ WWCR.

Sounds of Silence: The FCC unplugged no less than three FM stations in San Bernardino, Calif. These were California State University's station, KSSB/106.3; San Bernardino Valley's station, KJRP/96.1; and gay-activist Pride Radio/102.5. All three were low-powered (less than 100 watts) unlicensed non-profit activities. The FCC contended that the stations all radiated too much signal to qualify under Part 15 regulations for unlicensed operation.

The two college stations decided to channel their future programming through telephone and cable TV lines to reach buildings on their respective campuses. *Pride Radio* said it would cut its power to bring the station into Part 15 compliance.

FCC engineer Jim Zoulek claimed that

Changed FM Call Letters

New	Was	
KCOU	KEJJ	Columbia, MO
KIHT	KRJY	St. Louis, MO
KKHG	KUDO	Tucson, AZ
KKIS-FM	KAZO	Soldotna, AK
KLLZ-FM	KLLZ	Walker, MN
KMXI	KPAY-FM	Chico, CA
KNJZ	KATZ-FM	Alton, IL
KODZ	KICR	Eugene, OR
KOQQ	KCHT	Bakersfield, CA
KQSC	KIQS-FM	Willows, CA
KRCW	KOVN	Royal City, WA
KREV	WTCX	Lakeville, MN
KRNH	KATG	Comfort, TX
KROW	KHOV	Mariposa, CA
KRSQ	KTWM	Laurel, MT
KRVI	KREL	Copperopolis, CA
KSCY	KGVW-FM	Belgrade, MT
KSOL	KSRY	San Francisco, CA
KSSS	KBMK	Bismarck, ND
KSTH	KFNV-FM	Ferriday, LA
KXRS	KHYE	Hemet, CA
KYCY	KYA	San Francisco, CA
KYLD	KSOL	San Meteo, CA
KYLZ	KSRI	Santa Cruz, CA
WAAV-FM	WAHG	Leland, NC
WAFJ	WUOZ	Belvedere, SC
WAPC	WKNK	Edmonton, KY
WBGT-FM	WKDW-FM	Staunton, VA
WBPR	WAYW	Worchester, MA
WCBC-FM	WKZG	Keyser, WV
WCBZ	WHTE	Williamson, NC
WDJY	WCWB-FM	Trenton, FL
WECQ	WRCD	Clyde, NY
WEGX	WZNS	Dillon, SC
WGLX-FM	WWRW	Wisconsin Rapids, WI
WIBB	WVVY	Fort Valley, GA
WJFM	KAFL	Baton Rouge, LA
WJJX	WJJS	Lynchburg, VA
WJKE	WSSV	Stillwater, NY
WJXA	WZEZ	Nashville, TN
WLCT	WAHE	Lafayette, TN
WMJY	WQID	Biloxi, MS
WMXP	WKZW	Peoria, IL
WMXQ	WAPI-FM	Birmingham, AL
WMXZ	WLGH	Defuniak Springs, FL
WOCN-FM	WATB	South Yarmouth, MA
WOLV	WOLF-FM	Hougthon, MI
WRCD	WFUD	Honeoye Falls, NY
WREV-FM	WLOL	Cambridge, MN
WGRW	WRZY	Somersworth, NH
WRGX	WXPS	Briarcliff Manor, NY
WROC-FM	WLOL	Fort Myers Villas, FL
WRRX	WGGG	Micanopy, FL
WSOJ	WSVV	Petersburg, VA
WTHC	WAGD	Seeleyville, IN
WVBO	WMGV	Oshkosh, WI
WVVC	WEIF	Utica, NY
WWRO	WJLQ	Pensacola, FL
WWSS	WZLQ	McClellanville, SC

Applied to Construct New FM Stations

AL	Normal	103.5 MHz	25 watts (WTAK-FM booster)
CA	Chico	88.1 MHz	109 kW
CA	Templeton	100.5 MHz	1 kW
CA	Ukiah	88.9 MHz	160 watts
CO	Evergreen	96.5 MHz	100 kW
FL	Key Largo	91.7 MHz	100 kW
IA	Decorah	104.7 MHz	4.5 kW
IL	La Salle	91.3 MHz	8 kW
IL	Sterling	91.5 MHz	2.1 kW
IL	Taylorville	94.3 MHz	4.4 kW
IN	Hagerstown	90.5 MHz	525 watts
LA	Ruston	88.3 MHz	250 watts
MA	North Dartmouth	89.3 MHz	15 kW
MA	Pittsfield	91.3 MHz	300 watts
MS	Potts Camp	95.9 MHz	6 kW
NJ	Long Branch	88.1 MHz	200 watts
NV	Fallon	101.3 MHz	6 kW
NY	Great Gorge	105.3 MHz	340 watts
NY	Minetto	106.5 MHz	5.7 kW
OH	Athens	95.9 MHz	6 kW
OH	Bryan	88.5 MHz	15 kW
OH	Coshocton	91.1 MHz	6 kW
OH	Marion	90.9 MHz	2.4 kW
OR	Bonanza	102.9 MHz	785 watts
OR	Merrill	105.7 MHz	112 watts
PA	Erie	90.5 MHz	1.7 kW

Permits Granted to Construct New FM Stations

AR	Mountain Pine	101.9 MHz	6 kW
FL	Gifford	94.7 MHz	3 kW
ID	Pocatello	105.5 MHz	90 watts (KOSZ booster)
IL	Oregon	106.1 MHz	3 kW
IN	Walton	93.7 MHz	6 kW
ME	Islesboro	105.5 MHz	25 kW
MN	Worthington	89.3 MHz	100 kW
MO	Kennett	104.3 MHz	6 kW
NY	Potsdam	90.3 MHz	100 watts
OR	Myrtle Point	94.1 MHz	2.2 kW
TX	Big Sandy	90.7 MHz	10 kW
TX	Jacksboro	93.7 MHz	6 kW
WI	Iron River	107.3 MHz	50 kW

Cancelled

KWUA Clovis, NM	102.3 MHz	25 kW

New FM Call Letters Issued

KAHF	Ortonville, MN
KAHK	Mamou, LA
KAHL	Benavides, TX
KAHO	Junction, TX
KAHP	Grants, NM
KAHT	Idalou, TX
KAHV	Waldo, AR
KAHW	College Station, TX
KAHX	Ingleside, TX
KAHY	Myrtle Point, OR
KLFN	Worthington, OH
KPRD	Hays, KS
KUSZ	Proctor, MN
WAEM	Miami, FL
WAHL	Ocracoke, NC
WAHP	Southern Pines, NC
WAHU	Hudson, MI
WAHX	Monticello, FL
WAHY	Midway, KY
WBFJ-FM	Winston-Salem, NC
WCKM-FM	Lake George, NY
WGCF	Paducah, KY
WJSJ	Sumrall, MS
WKQS	Gifford, FL
WNXR	Iron River, WI
WPEX	Kenbridge, VA
WYAI	Bowdon, GA
WZVA	Marion, VA

THE MUSIC STATION
WJML
99 FM / AM11

WJML, of Petoskey, Mich., has a dual-purpose bumper sticker that serves the FM and AM outlets. (Courtesy of Kevin Scott, Lake Worth, Fla.)

his agency had closed down only three other unlicensed broadcast stations during the past five years within California's seven southernmost counties.

Much appreciated information from Ronald Rogers, of Rialto, Calif.

Changes On Tap: Trevor Fletcher, our faithful and intrepid reporter in Edmonton, Alberta, Canada, advises that classic rocker CIRK-FM/97.3 (better known as *K-97*) is close to being sold. Last year, the station had some key personnel losses, which negatively impacted operations there. Things had already been rough at *K-97* since another local classic rocker, *The Bear*, went into aggressive head-to-head competition with them in 1992.

No Sound of Music: A note from Al Ogrizovich, KX5U, of NAS Mayport, Fla., tells us that he was in North Carolina recently and did some dial twirling. When he tuned past 92.9 MHz, he hit upon an interesting station. Unusual it was because the format consisted entirely of sound effects. That's right—trains, horses, thunder, bells, creaking doors, motorcycles, and the rest. He tried the frequency a number of times over a period of several days, and eventually picked up the ID of WZNS, Dillon, S.C.

When Al returned home to Fla., he gave the station a landline and asked what was going on. A station employee told him that the station had a new owner and they just wanted to get the attention of listeners. Strange, yes. Nevertheless, Al reports that the unusual programming definitely had no trouble attracting his attention! We note that the new owners of WZNS have recently changed its call letters to WEGX. By now, they surely have adopted a more traditional program format.

Expanded Band Shrinkage: The basic idea was to fit 250 AM'ers into the 1605 to 1705 KHz new portion of the band. It now appears that the FCC's computer has done some recalculating of interference factors and came up with bad news. 'Peers as though possible interference problems to Canadian and Mexican border stations could cut the number of new US stations there from 250 down to fewer than 100. This came as a let down after all of the ballyhoo about what this new expanded band promised in the way of relief from crowded conditions on frequencies below 1605 kHz. Nearly 1,000 stations sought access to the previously announced 250 slots in the new expanded band.

American stations using the new frequency band will be expected to use stereo, and utilize 10 kW daytime, 1 kW nights. Stations emigrating to the expanded band on 1580 kHz and below are going to be permitted to simulcast on both the new and old frequencies for up to five years.

FCC Control Questioned: Sen. Robert Dole (R-Kans.) commented that after the FCC "dropped the ball with the implementation of the Cable TV Act," he "must question the Congress' judgment when it considers granting the FCC greater control of the communications industry. Dole was making specific reference to the possibilities of the FCC regulating the much-heralded information superhighway. Pending legislation would allow cable and phone companies to compete, based upon FCC regulation and control. Dole's opinion is that the Senate bill on the information highway is the most comprehensive step in more than half a century, but that "it will look like child's play if we decide to expand the FCC's authority."

That was blunt. Well, Sen. Dole never liked the Cable TV Act to begin with. It's hard to defend this Act, particularly since it disappointed so many people after going into effect. The FCC's calculations for reducing cable TV rates proved to have more loopholes than a Philadelphia contract.

Cuban Jamming to Come?: Our government is pleased with the AM and SW efforts of *Radio Marti*. These are Spanish language news, political, information, and entertainment programs beamed into Cuba from the USA, and paid for by the United States Information Agency (USIA). For the past three years, the USIA has also had *TV Marti*, a VHF station operating from south Florida. Castro hasn't liked any of this very much, but the National Association of Broadcasters (NAB) has now become concerned that he will like things all the less if the USIA goes ahead with a report's suggestions that it move *TV Marti* from VHF to a UHF channel. Should the USIA be willing to spend $1-million for this project, it could reach a larger number of viewers, provide better programs, operate longer hours, and save more than $6-million a year in operating expenses.

What the NAB fears is that Castro will retaliate by firing up his million-watt AM broadcast transmitters. That would jam AM broadcasting in the USA north to Pennsylvania, west to Colorado. Audiences would be affected, so would about 2,500 radio stations.

A USIA decision was in the process of being worked out as this is written. Maybe it will have been announced by the time you read this.

October Man: My shift in the booth is up, so it's time to cue up the theme and ask you to tune in again next month. Please send along your AM and FM station photos, news clippings, bumper stickers, format changes, and comments. This material is appreciated and very useful in bringing you this column. ■

EMERGENCY

BY GORDON WEST, WB6NOA

COMMUNICATIONS FOR SURVIVAL

Remote Base Communications

Urban rescue agencies may choose an expensive trunked radio system for high volumes of communications up between 856 MHz and 861 MHz. The assignment is normally five channels with one channel carrying radio-controlled data. This is an expensive system, but for municipalities running rescue squads, it's a positive way to establish crystal-clear communications to base and mobile units.

For the licensed ham radio operator working with local rescue squads, incoming Japanese dual-band handheld transceivers no longer allow for public safety 800 MHz receive capabilities. Recently enacted scanner laws caused ham radio manufacturers to reconsider restorable 800 MHz public safety receive capabilities. The new chips have no 800 MHz in them at all.

Paramedic rescue squads are usually found on UHF frequencies, with many systems using the block of eight channels on 463 MHz. Commercial rescue and ambulance agencies may also operate under a business radio license near these frequencies for superb handheld and mobile coverage.

The switch to 220 MHz and amplitude compandered sideband has been slow for many rescue squads because of the relatively high cost in new ACSB equipment. But do expect many urban rescue agencies to consider the new 220 MHz band and those dedicated special emergency frequencies for their upcoming radio system.

The 155 MHz band still continues to be a popular one for rural rescue agencies needing a relatively low-cost system. Repeaters are not allowed on the 155 MHz special emergency frequencies, so unit-to-unit transmissions are limited to about a 10 mile range. However, ambulance companies and rescue squads down on 155 MHz may employ a hard-wired remote base system that could be placed high atop a local skyscraper. This increases base-to-mobile and base-to-portable range. Most manufacturers of base station VHF equipment offer full remote capabilities when tied into the local phone system with a dedicated line. This would allow a dispatcher to transmit and receive on a simplex frequency—such as 155.160 MHz—and have extra-long-range capabilities by that antenna system being high atop a building or at a communication facility high atop a mountain.

Way down at 30 MHz, rescue squads and ambulance companies almost always use a remote base for dispatching the radio calls. The 30 MHz frequency is similar to 155 MHz where no repeaters are allowed, and unit-to-unit communications are strictly line of sight.

Volunteer rescue squads made up of all licensed amateur radio operators have taken advantage of relatively inexpensive dual-band and tri-band amateur radio mobile equipment capable of cross-band, full-duplex, remote control. The system could be used for regular ham radio calls as well as put into high gear for an emergency exercise or the real thing.

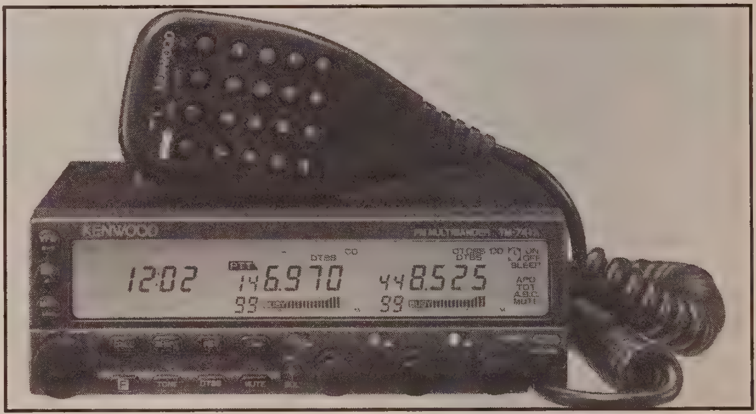
The entire system requires a minimum of a no-code Technician class license, and everyone utilizing dual-band equipment on 144 and 440 MHz. The remote-control station is usually a dual-band or tri-band mobile transceiver, run on back-up batteries, and located high atop a building or tall mountain. In an emergency, this set might be the dual-band transceiver found in regular use in a ham's vehicle.

The mountain top remote alternates electronically between 2 meters and 440, sampling a specific pre-assigned frequency for activity. Both sides of the receiver on

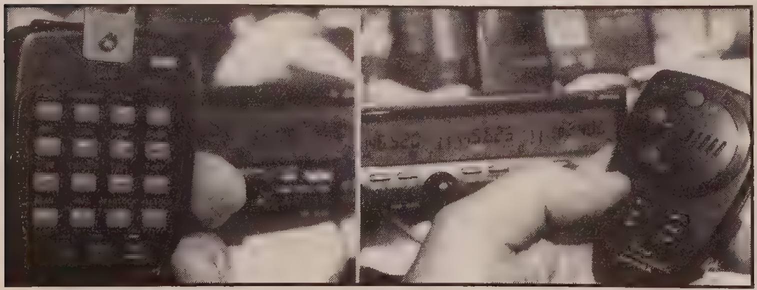
(Continued on page 46)

SCN
HRN
PGM
AUX
MODE
ESPS20
H
A/N
MON
T/A
VS

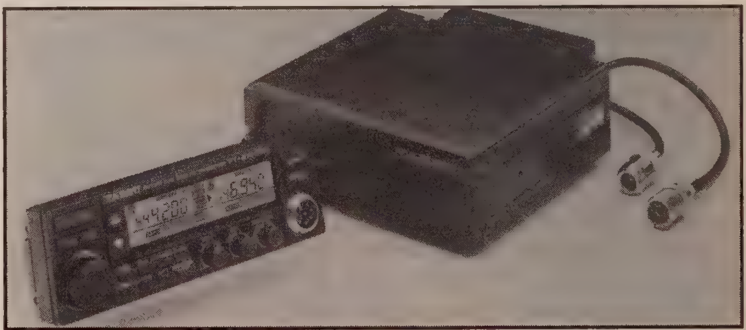
The new 220 MHz emergency radio service A.C.S.B. transceiver.



This Kenwood dual band receiver is a good remote controlled dual band "repeater."



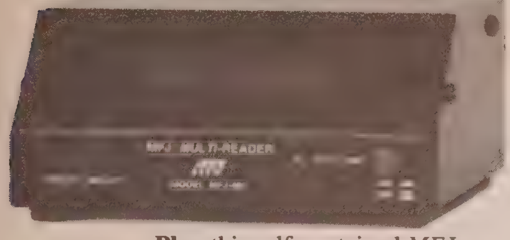
Licensed hams can program the new ICOM Delta 100 into cross band repeat mode.



Popular Yaesu dual-band cross-band remote transceiver.

Tap into secret Shortwave Signals

Turn mysterious signals into exciting text messages with this new MFJ MultiReader™



MFJ-462
$149.95

Plug this self-contained *MFJ MultiReader™* into your shortwave receiver's earphone jack.

Then *watch* mysterious chirps, whistles and buzzing sounds of RTTY, ASCII, CW and AMTOR turn into exciting text messages as they scroll across your easy-to-read LCD display.

You'll *read* interesting commerical, military, diplomatic, weather, aeronautical, maritime and amateur traffic . . . traffic your friends can't read -- unless they have a decoder.

Eavesdrop on the World

Eavesdrop on the world's press agencies transmitting *unedited* late breaking news in English -- China News in Taiwan, Tanjug Press in Serbia, Iraqui News in Iraq -- all on RTTY.

Copy RTTY weather stations from Antarctica, Mali, Congo and many others. Listen to military RTTY passing traffic from Panama, Cyprus, Peru, Capetown, London and others. Listen to hams, diplomatic, research, commercial and maritime RTTY.

Listen to maritime users, diplomats and amateurs send and receive error free messages using various forms of TOR (Telex-Over-Radio).

Monitor Morse code communications from hams, military, commercial, aeronautical, diplomatic and maritime coastal stations from all over the world -- Australia, Russia, Hong Kong, Japan, Egypt, Norway, Israel, Africa, Portugal.

Printer Monitors 24 Hours a Day

MFJ's exclusive *TelePrinterPort™* lets you monitor any station 24 hours a day by printing their transmissions on your Epson compatible printer.

Printer cable, **MFJ-5412**, $9.95.

MFJ *MessageSaver™*

You can save several pages of text in 8K of memory for re-reading or later review using MFJ's exclusive *MessageSaver™*.

High Performance Demodulator

MFJ's high performance *phaselock loop* demodulator consistently gives you solid copy -- even with weak signals buried in noise.

Easy to use, tune and read

It's easy to use -- just push a button to select modes and features from a menu.

It's easy to tune -- a precision tuning indicator makes tuning your receiver easy for best copy.

It's easy to read -- the 2 line 16 character LCD display with contrast adjustment is mounted on a sloped front panel for easy reading.

Copies most standard shifts and speeds. Has *MFJ AutoTrak™* Morse code speed tracking.

Use 12 VDC or use 110 VAC with MFJ-1312B AC adapter, $12.95. 5¼x2½x5¼ inches.

No Matter What Guarantee

You get MFJ's famous one year *No Matter What™ unconditional* guarantee. That means we will repair or replace your *MFJ MultiReader™* (at our option) *no matter what* for a full year.

Try it for 30 Days

Order an *MFJ-462 MultiReader™ from* MFJ and try it in your own setup -- compare it to any other product on the market regardless of price.

Then if you're not completely satisfied, simply return it within 30 days for a prompt and courteous refund (less shipping).

Order today and try it -- you'll be glad you did.

Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a "first rate easy-to-operte active antenna . . . quiet . . . excellent dynamic range . . . good gain . . . low noise . . . broad frequency coverage."

Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz to 30 MHz.

Receives strong, clear signals from all over the world. 20dB attenuator, gain control, ON LED. Switch two receivers and aux. or active antenna. 6x3x5 in. remote has 54 inch whip, 50 ft. coax. 3x2x4 in. 12 VDC or 110 VAC with MFJ-1312, $12.95.

$129.95 MFJ-1024

Indoor Active Antenna

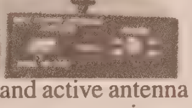
MFJ-1020A
$79.95

Rival outside long wires with this *tuned* indoor active antenna. *"World Radio TV Handbook"* says MFJ-1020 is a "fine value . . . fair price . . . best offering to date . . . performs very well indeed."

Tuned circuitry minimizes intermod, improves selectivity, reduces noise outside tuned band. Use as preselector with external antenna. Covers 0.3-30 MHz. Has Tune, Band, Gain, On/Off/Bypass Controls. Detachable telescoping whip. 5x2x6 in. Use 9 volt battery, 9-18 VDC or 110 VAC with MFJ-1312, $12.95.

Compact Active Antenna

MFJ-1022
$39.95



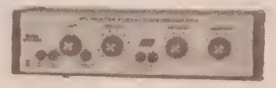
Plug this new *compact* MFJ all band active antenna into your general coverage receiver and you'll hear strong clear signals from all over the world from 300 KHz to 200 MHz -- including low, medium, shortwave and VHF bands.

Also improves scanner radio reception on VHF high and low bands.

Detachable 20 in. telescoping antenna. 9 volt battery or 110 VAC with MFJ-1312B, $12.95. 3⅛x1¼x4 in.

MFJ Antenna Matcher

MFJ-959B
$89.95



Matches your antenna to your receiver so you get maximum signal and minimum loss.

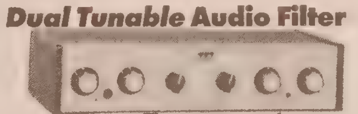
Preamp with gain control boosts weak stations 10 times. 20 dB attenuator prevents overload. Pushbuttons let you select 2 antennas and 2 receivers. Cover 1.6-30 MHz. 9x2x6 inches. Use 9-18 VDC or 110 VAC with MFJ-1312, $12.95.

High-Gain Preselector

MFJ-1045B
$69.95

High-gain, high-Q receiver preselector covers 1.8-54 MHz. Boost weak signals 10 times with low noise dual gate MOSFET. Reject out-of-band signals and images with high-Q tuned circuits. Pushbuttons let you select 2 antennas and 2 receivers. Dual coax and phono connectors. Use 9-18VDC or 110 VAC with MFJ-1312, $12.95.

Dual Tunable Audio Filter

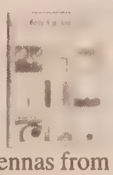


MFJ-752C
$99.95

Two separately tunable filters let you peak desired signals and notch out interference at the same time. You can peak, notch, low or high pass signals to eliminate heterodynes and interference. Plugs between radio and speaker or phones. 10x2x6 in.

Easy Up Antennas Book

MFJ-38
$16.95



How to build and put up inexpensive, fully tested wire antennas using readily available parts that'll bring signals in like you've never heard before.

Covers receiving antennas from 100 KHz to almost 1000 KHz. Includes antennas for long, medium and shortwave, utility, marine and VHF/UHF services.

Receive *Color* News Photos, Weather Maps, RTTY, ASCII, Morse Code

MFJ-1214PC
$149.95

Use your computer and radio to receive and display *brilliant full color* FAX news photos and incredible WeFAX weather maps with all 16 gray levels. Also RTTY, ASCII and Morse code.

Animate weather maps. Display 10 global pictures simultaneously. Zoom any part of picture or map. Frequency manager lists over 900 FAX stations. Automatic picture capture and save.

Includes interface, easy-to-use menu driven software, cables, power supply, comprehensive manual and Jump-Start™ guide. Requires 286 or better computer with VGA monitor.

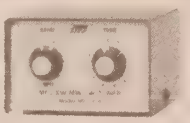
Super Hi-Q Loop™ Antenna

MFJ-1782
$269.95

The *Super Hi-Q Loop™* is a professional quality remotely tuned 10-30 MHz high-Q antenna. It's very quiet and has a very narrow bandwidth that reduces receiver overloading and out-of-band interference.

High-Q Passive Preselector

MFJ-956
$39.95



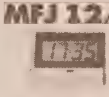
The MFJ-956 is a *high-Q* passive LC preselector that lets you boost your favorite stations while rejecting images, intermod and other phantom signals. Covers 1.5-30 MHz. Has preselector bypass, receiver grounded position. 2x3x4 in.

Mobile Scanner Ant.

MFJ-1824BB/BM
$19.95

Cellular look-a-like. Covers 25-1300 MHz. Highest gain on 406-512 and 108-174 MHz, 19 in. Magnet mount. MFJ-1824BB has BNC/UHF plug; MFJ-1824BM has Motorola plug.

MFJ 12/24 Hour LCD Clocks



MFJ-107B
$9.95

MFJ-108B
$19.95

MFJ-105B
$19.95

MFJ-108B, dual clock displays 24 UTC and 12 hour local time *simultaneously*. **MFJ-107B**, single clock shows you 24 hour UTC time. *3 star rated* by *Passport to World Band Radio*!

MFJ-105B, accurate 24 hour UTC quartz *wall clock* with large 10 inch face.

MFJ Antenna Switches

MFJ-1704
$59.95

MFJ-1702B
$21.95

MFJ-1704 heavy duty antenna switch lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection device. Good to 500 MHz. 60 dB isolation at 30 MHz.

MFJ-1702B for 2 antennas.

World Band Radio Kit

MFJ-8100K
$59.95 *kit*

MFJ-8100W
$79.95 *wired*

Build this *regenerative* shortwave receiver *kit* and listen to shortwave signals from all over the world with just a 10 foot wire antenna.

Has RF stage, vernier reduction drive, smooth regeneration, five bands.

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CIRCLE 120 ON READER SERVICE CARD

POP'COMM'S World Band Tuning Tips

September—1994

Freq.	Station/Country	UTC	Notes
2360	R. Maya, Guatemala	1130	
2460	R. Alvorada, Brazil	0900	PP
3205	R. Ribeirao Preto, Brazil	0000	pp
3210	R. Mozambique	0300	PP
3220	HCJB, Ecuador	0000	Quechua
3220	Channel Africa	0400	
3222	R. Kara, Togo	0600	FF
3230	R. Oranje, S. Africa	0400	EE/Afk
3270	Ondas del Oriente, Ecuador	1015	SS
3280	La Voz del Napo, Ecuador	1000	SS
3290	R. Centro, Ecuador	1000	SS
3316	SLBS, Sierra Leone	0600	
3325	R. Maya, Guatemala	1100	
3340	R. Altura, Peru	1000	SS
3356	R. Botswana	0400	
3370	R. Tezulutlan, Guatemala	1100	SS
3375	R. Nacional Sao Gabriel, Brazil	1000	PP
3380	R. Chortis, Guatemala	1130	SS
3385	Educadora Rural, Brazil	0930	PP
3925	R. Tanpa, Japan	1030	JJ
3985	Swiss R. Int'l	0600	
3995	Deutsche Welle, Germany	0400	GG
4505	R. Horizonte, Peru	0930	SS
4510	R. Paucartambo, Peru	1000	SS
4725	V of Myanmar	1100	Burmese
4753	RRI Unjang Pandang, Indonesia	1100	II
4760	ELWA, Liberia	0555	s/on
4765	RTVC, Congo	0355	s/on, FF
4770	R. Nigeria, Kaduna	0500	
4770	Centinela del Sur, Ecuador	0200	SS
4780	Onda Musical, Dominican Rep.	0200	SS
4795	R. Aquidauana, Brazil	1000	PP
4805	Rdf. Amazonas, Brazil	0030	PP
4810	R. 2000, S. Africa	0230	
4825	La Voz de la Selva, Peru	1000	SS
4830	R. Tachira, Venezuela	0200	SS
4835	VL8A, Alice Springs, Australia	0800	
4845	R. Mauritania	0600	FF
4851	R. Luz y Vida, Ecuador	1000	SS
4865	La Voz del Cinaruco, Colombia	0100	SS
4870	ORTB, Benin	0500	FF
4885	R. Clube do Para, Brazil	0830	PP
4890	NBC, Papua New Guinea	1100	
4900	RTV Guineenne, Guinea	0600	FF
4910	Zambia Broadcasting Corp.	0345	lang.
4915	GBC, Ghana	0600	
4920	R. Quito, Ecuador	0300	SS
4930	R. Internacional, Honduras	0300	SS
4935	R. Tropical, Peru	1000	SS
4970	R. Rumbos, Venezuela	0200	SS
4990	R. Nigeria	0500	
5020	Solomon Is. Bc Corp.	0700	
5025	R. Parakou, Benin	0500	FF
5025	R. Transamazonica, Brazil	0930	PP
5034v	RTV Centrafricaine, Central Af. Rep.	0500	FF
5047	RTV Togolaise	0524	s/on, FF
5055	TIFC, Costa Rica	0400	
5056	RFO, Fr. Guiana	1000	FF
5060	R. Nac. Progresso, Ecuador	0300	SS
5075	Caracol, Colombia	0300	SS
5286	R. Moundou, Chad	0500	FF
5895	Croatian Radio	0800	
5900	R. Vlaanderen Int'l, Belgium	0000	
5905	Swiss Radio Int'l, via Brazil	0100	
5930	R. Prague, Czech Rep.	0000	
5975	BBC via Antigua	0400	
5995	R.Melodia, Peru	0800	SS
6005	BBC relay, Ascension Island	0300	
6015	R. Austria Int'l, via Canada	0530	
6025	R. Amanacer, Dominican Rep.	0300	
6040	R. Cl. Paranaense, Brazil	0800	PP
6050	HCJB, Ecuador	0700	PP
6060	RAI, Italy	0300	II
6060	R. Nacional, Argentina	0500	SS
6060	RAI—Radio Uno, Sicily	0530	II
6095	Vatican Radio	0250	
6100	Deutsche Welle, Germany	0400	GG
6105	R. Universidad de Costa Rica	0300	SS
6115	R. Union, Peru	0900	SS
6120	R. Globo, Brazil	0900	PP
6130	CHNX, Halifax, Canada	0500	
6150	AWR, Costa Rica	0600	
6165	R. Netherlands, via Bonaire	0400	
6175	Faro del Caribe/TIFC, Costa Rica	1000	SS
6180	R. Nacional Mendoza, Argentina	0830	SS
6185	R. Educacion, Mexico	0600	SS
6195	R. Yugoslavia	0100	
6205	HCJB, Ecuador	0300	
6235	R. Quisqueya, Dominican Rep.	0200	SS
6245	Vatican Radio	0640	
6250	R. Nacional, Eq. Guinea	0500	SS
6560	Rep. of Iraq Radio	0254	s/on, AA
6890	R. Bosnia Hercegovina	0235	Croatian
7100	VOIRI, Iran	0028	s/on
7125	Cyprus Bc. Corp (wknds)	2230	Greek
7150	Capital Radio, S. Africa	0330	
7160	BBC via Singapore	1100	
7185	Channel Africa, S. Africa	0400	FF
7190	R. Africa, Eq. Guinea	0500	s/on
7200	Rep. of Sudan Radio	0300	AA
7250	Vatican Radio	0600	
7255	V of Nigeria	0500	
7265	Sudwestfunk, Germany	2200	GG
7270	AWR, Solvakia	0230	Hindi
7275	ELBC, Liberia	0655	s/on
7294	R. Europe, Italy	0745	USB
7345	Czech Rep. Radio	0700	
7365	KNLS, Alaska	0830	
7385	TWR, Monaco	0700	
7475	RTT Tunisienne, Tunisia	0500	AA
9165	R. Omdurman, Sudan	0255	sign on, AA
9400	Radio For Peace Int'l, Costa Rica	0000	SS
9420	Voice of Greece	0130	GG/EE
9435	Kol Israel	0500	
9445	Voice of Turkey	2330	TT
9445	AWR via Slovakia	0357	s/on
9475	R. Cairo, Egypt	0200	
9480	TWR, Monaco	0730	
9495	Radio France Int'l	2030	FF
9505	R. Record, Brazil	2300	PP
9510	R. Romania Int'l	0200	
9510	R. Tashkent, Uzbekistan	1200	
9530	R. Singapore Int'l	1100	
9535	R. Japan	1400	
9540	R. Nacional Espana, Spain	0100	
9540	R. Tashkent, Uzbekistan	1200	
9560	R. Jordan	1500	
9570	R. Portugal	0230	
9570	R. Romania Int'l	0230	
9575	Radio Medi Un, Morocco	0730	FF
9580	R. Tirana, Albania	0230	
9580	Africa No. One, Gabon	2200	FF
9585	Channel Africa	0250	s/on
9590	R. Netherlands via Bonaire	0500	SS
9610	R. Japan	1100	
9620	R. Dniester Int'l, Moldavia	2130	
9620	Spanish Nt'l Radio, via Costa Rica	0200	SS
9620	SODRE, Uruguay	0030	SS
9635	R. Portugal	0230	
9645	TIFC, Costa Rica	0900	
9650	R. Korea, S. Korea, via Canada	1130	
9655	R. New Zealand Int'l	1300	
9675	R. Japan via Fr. Guiana	0830	
9680	RRI, Indonesia	1200	
9685	R. Ukraine Int'l	2300	Ukrainian
9690	China Radio Int'l, via Spain	0300	
9700	R. New Zealand Int'l	0800	
9715	VOA relay, Thailand	1400	CC
9725	RAI, Italy	0050	
9745	HCJB, Ecuador	0730	

Freq.	Station/Country	UTC	Notes
9746	R. Bahrain	2130	AA
9750	R. Korea, S. Korea	1200	
9755	Radio Canada Int'l	0000	
9760	R. Tirana, Albania	0330	Alb.
9765	V of Mediterranean, Malta	0630	
9770	V of UAE	2200	
9779	Rep. of Yemen Radio	2100	AA
9780	China Radio Int'l, via Mali	0300	
9800	R. France Int'l, via Fr. Guiana	0530	SS/FF
9810	FEBA, Seychelles	1500	
9815	Radio Havana Cuba	0200	USB
9830	R. Jordan	1900	AA
9840	R. Kuwait	2100	AA
9850	R. Sweden	0230	
9860	R. Australia	0700	
9880	R. Austria Int'l	0130	
9885	Swiss R. Int'l	0100	
9900	R. Cairo, Egypt	2230	
9925	R. Vlandeeren Int'l, Belgium	2000	SS
9955	WRMI, Miami	due on	
9990	R. Cairo, Egypt	1800	AA
11335	R. Pyongyang, N. Korea	0000	
11402	INBS, Iceland	2300	Icelandic
11430	R. Uno relay, Canary Islands	2100	SS (USB)
11550	RTV Tunisienne, Tunisia	1600	AA
11587	Kol Israel	2230	
11610	AWR, Solovakia	1700	
11620	All India Radio	2000	
11625	Vatican Radio	0630	
11645	Voice of Greece	1600	Greek
11650	FEBC, Philippines	2300	
11660	Radio Australia	1500	
11665	R. Netherlands, Madagascar	0030	
11680	China Radio Int'l via Fr. Guiana	0400	
11690	FEBC, Philippines	1200	VV
11710	UAE Radio, Abu Dhabi	2330	AA
11710	RAE, Argentina	0200	
11715	China R. Int'l, via Mali	0300	
11720	R. Bulgaria	1900	
11725	R. Korea, S. Korea	1000	SS
11740	BSKSA, Saudi Arabia	0500	AA
11745	R. Tirana, Albania	0200	
11755	R. Finland Int'l	0130	
11765	R. Universo, Brazil	2330	PP
11785	Rdf. Nacional, Colombia	1900	SS
11785	R. Guaiba, Brazil	2330	PP
11800	R. Australia	1300	
11800	RAI, Italy	0100	
11805	KTWR, Guam	0930	
11815	Spanish Ntl Radio, via Costa Rica	0100	SS
11825	R. Tirana, Albania	2200	
11827	R. Tahiti	0300	FF/TT
11830	Vatican Radio	2230	
11835	HCJB, Ecuador	0700	
11840	R. Japan	1100	JJ
11850	R. Denmark, via Norway	1530	DD
11865	Deutsche Welle, Germany	0000	
11885	UAE Radio, Abu Dhabi	2330	
11890	R. Oman	2100	AA
11895	Voice of Turkey	2300	
11910	R. Australia	0615	s/on
11910	R. Budapest, Hungary	2200	
11915	R. Gaucha, Brazil	0000	PP
11945	R. Canada Int'l	2100	
11950	Kazakh Radio	0000	
11975	R. France Int'l	1600	
11985	UAE Radio, Dubai	2100	AA
11990	R. Kuwait	1800	
12005	RTT Tunisia	1400	AA
12035	Swiss Radio Int'l, via Gabon	2000	
12050	R. Cairo, Egypt	0300	AA
12085	R. Damascus, Syria	2030	
13590	R. Pakistan	1600	
13605	Capitol Radio via UAE, Abu Dhabi	2230	
13615	R. Bangladesh	1230	
13620	R. Kuwait	2000	
13625	KWHR, Hawaii	1800	
13635	Swiss Radio Int'l	1700	
13660	R. Havana Cuba	0200	USB, EE
13675	UAE Radio, Dubai	1630	
13680	Deutsche Welle, Germany	1600	
13690	R. Canada Int'l	2200	
13715	R. Havana Cuba	2200	SS, USB
13720	AWR, Guam	1600	non-EE
13750	AWR, Costa Rica	1200	s/on
13750	Reshet Bet, Israel	1415	Yiddish
13760	R. Pyongyang, N. Korea	0000	s/on
13835	INBS, Iceland	1230	Icelandic
13830	Croatian Radio	1800	
15050V	R. Patria Libre, clandestine	2130	SS, irr.
15084	VOIRI, Iran	0100	Farsi
15090	Vatican Radio	2245	s/on
15100	FEBC, Philippines	1400	EE/others
15115	Radio New Zealand Int'l	0200	
15130	R. Pyongyang, N. Korea	0000	
15165	R. Havana Cuba	2145	
15168	R. Tahiti	0300	FF/TT
15175	FEBA, Seychelles	1100	AA
15185	R. Finland Int'l	2300	
15195	R. Ukraine	0030	
15200	RFI, France via Fr. Guiana	2300	SS
15235	V of Great Homeland, Libya	2000	AA
15240	Channel Africa, S. Africa	1600	
15240	R. Sweden	1330	
15260	VOIRI, Iran	0030	
15270	HCJB, Ecuador	1930	
15305	UAE Radio, Abu Dhabi	2340	
15305	R. Canada Int'l	1530	
15325	R. Japan via Fr. Guiana	0300	
15345	RTV Morocaine, Morocco	1800	AA
15345	RAE, Argentina	0200	SS
15350	R. Luxembourg	1800	GG
15395	UAE Radio, Dubai	1330	AA
15400	R. Finland Int'l	1330	
15410	VOA, Morocco relay	2200	s/off
15420	R. Tashkent, Uzbekistan	1200	
15425	SLBC, Sri Lanka	1500	
15430	Radio Japan	2300	
15445	R. France Int'l	2300	FF
15475	Africa Number One, Gabon	2100	FF
15505	Swiss Radio Int'l	1500	
15515	R. Portugal	1900	
15530	R. Australia	2200	II
15565	R. Australia	1200	
15575	R. Korea, S. Korea	0030	
15610	KTWR, Guam	1500	
15630	V of Greece	1430	GG/EE
15640	Kol Israel	1400	
15650	Voice of Greece	1830	
15675	R. Copan Int'l, Honduras	2300	SS
15770	ISBS, Iceland	1230	Icelandic
17490	HCJB, Ecuador	1000	
17500	RTV Tunisienne, Tunisia	1330	AA
17510	KWHR, Hawaii	2300	
17535	V of Greece	1430	GG/EE
17590	R. Finland	1430	
17595	R. Cairo, Egypt	1200	
17620	R. France Int'l	1600	
17630	Africa No. One, Gabon	1430	FF
17670	Swiss Radio Int'l	1500	
17690	R. Ukraine Int'l	0100	
17705	R. Havana Cuba	2130	SS
17725	R. Ukraine Int'l	1600	UU
17740	R. Finland Int'l	1430	
17745	R. Algiers, Algeria	1930	
17745	R. Tashkent, Uzbekistan	1200	
17760	R. Havana Cuba	2130	
17775	R. Romania Int'l	1300	
17790	HCJB, Ecuador	2130	
17805	R. Romania Int'l	1730	
17810	R. Japan	2300	
17820	R. Canada Int'l	1300	
17845	Spanish National Radio	1500	SS
17870	R. Sweden	1500	
17875	R. Canada Int'l	2030	
17880	R. Finland Int'l	1300	
17890	Spanish National R., via Costa Rica	2130	SS
17900	R. Portugal	2000	PP
21455	HCJB, Ecuador	1330	
21515	R. Portugal	1500	PP
21520	R. Pakistan	1100	
21590	R. Netherlands, Bonaire	1800	
21605	UAE Radio, Dubai	1430	AA
21605	R. Yugoslavia	1230	
21630	V of UAE	1100	AA
21740	R. Australia	2330	

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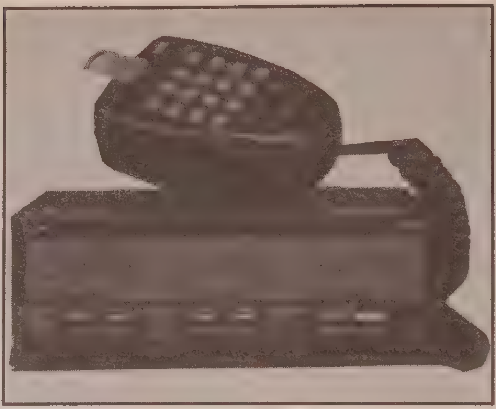


The ICOM Delta 100 can easily turn into a cross band repeater for emergency personnel.

VHF and UHF feature tone-coded squelch to insure selective response to only those signals intended to be passed through the remote on these specific frequencies.

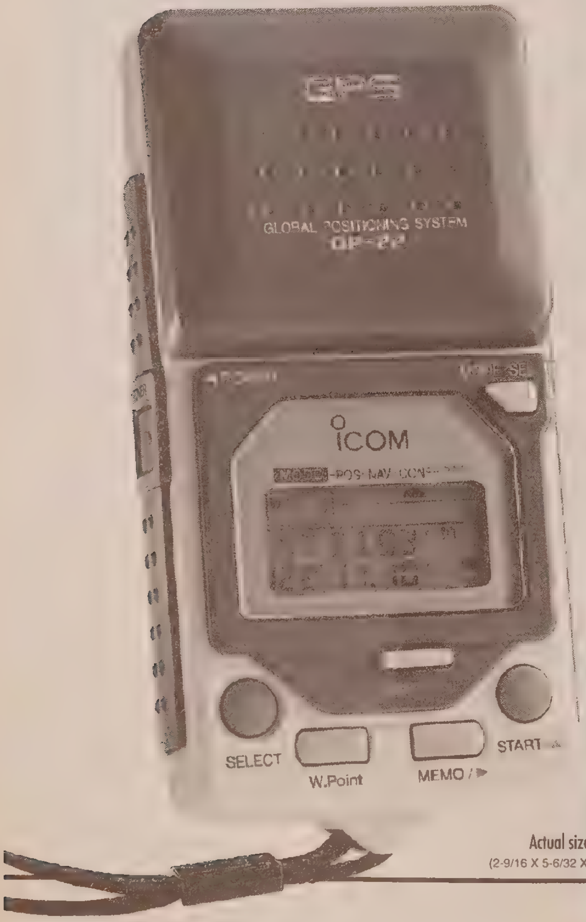
A signal on 438.160 MHz with a tone of 173 Hz would activate the remote, and it would simultaneously transmit out on—let's say—144.330 MHz. Activity on 144.330 MHz with the right tone could then respond to the call, and this would simultaneously repeat out back up on 438.160 MHz. The ham system is like a dual-band, cross-band repeater, and should be coordinated on both VHF and UHF frequencies with the local VHF and UHF frequency coordinators for the area. At no time should you put up a remote system without frequency coordination.

The new ICOM Delta 100 is a triple-band mobile transceiver, and has full remote capabilities to include frequency changing, power level and DTMF changes, and just about anything else you want to do with a little handheld miles away. Controlling the distant cross-band "repeater" requires the ICOM Delta 100 to have both accessory tone boards installed before it goes to the top of the hill.

Pushing the enter, B, 7, 8, C, * is an example of how to enable cross-band operation from 144 MHz to 440 MHz. You could also change frequencies, and do any other control as if you were at the remote site yourself, in front of the equipment. All you would need at your end of the circuit would be a small handheld transceiver with a DTMF pad that has A, B, C, and D keys.

Putting up a temporary remote cross-band link is ideal for emergency groups made up of licensed ham radio operators. Only the licensed hams could use the system. But getting a ham ticket for the no-code license is a breeze, so anyone not having the ham license could certainly get one in short order.

The benefits of a simple amateur radio cross-band transceiver that sets up in minutes will greatly enhance the communications capabilities of your emergency communications team. ■



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CIRCLE 71 ON READER SERVICE CARD

SATELLITE VIEW

BY DONALD E. DICKERSON, N9CUE

INSIDE THE WORLD OF SATELLITE COMMUNICATIONS

Weather Satellite Stations

Here comes the long awaited, much requested series on satellites featuring how to assemble your own station for tracking and/or receiving WEFAX weather maps from both polar orbiting and geo-stationary satellites.

This installment begins with a look at the spacecraft. Antennas, receivers, preamps, coax processors, and computers and their programs will be covered during the next few months.

Russia, China, and the United States have several polar orbiting weather satellites that transmit on the 137 MHz band. The Russian, American, and European Space Agencies also have weather satellites in geo-stationary orbit (22,000 miles). Since these satellites transmit in the 1691 MHz (1.6 GHz) range, they require a dish antenna and special feed horn to receive signals. We will explain how to build a dish antenna, as well as take a look at how to convert an inexpensive Radio Shack scanner into a WEFAX satellite receiver.

If you're interested in listening to the satellites while learning to track spacecraft, you only need a standard scanner covering the 136 to 138 MHz range. Since polar orbiting weather satellites have strong signals, they are easier to hear.

Before we get into the specifics of equipment we will take a look at weather satellites, where they are, and what information they transmit.

Link	Carrier Frequency	Information Signal	Baseline Bandwidth	Modulation
1. Beacon	137.77 MHz or 136.77 MHz	Low Bit Rate Instrument Data and Spacecraft Telemetry, All From TIP	8320 bps	Split-Phase PSK
2. VHF Real-Time —APT	137.50 MHz or 137.62 MHz	Medium Resolution Video Data From MIRP	2 KHz	AM/FM
3. S-Band Real-Time —HRPT	1698 or 1707* MHz	High Resolution Video Data and TIP Data From MIRP	665.4 kbps	Split-Phase PSK
4. S-Band Playback to CDA's	1698, 1702.5 or 1707 MHz	High Resolution and Medium Resolution Video Data From MIRP	2.6616 Mbps	Randomized NRZ-PSK
5. Data Collection (Uplink Only)	401.65 MHz	Data From Earth Based Platforms and Balloons	400 bps	Split-Phase PSK
6. S-Band TIP Data Playback	1698, 1702.5 or 1707 MHz	TIP Data Recovered From On-Board Recorders	332.7 kbps	Split-Phase PSK
7. Command Uplink	148.56 MHz	Digital Commands	1 kbps	Ternary FSK/AM

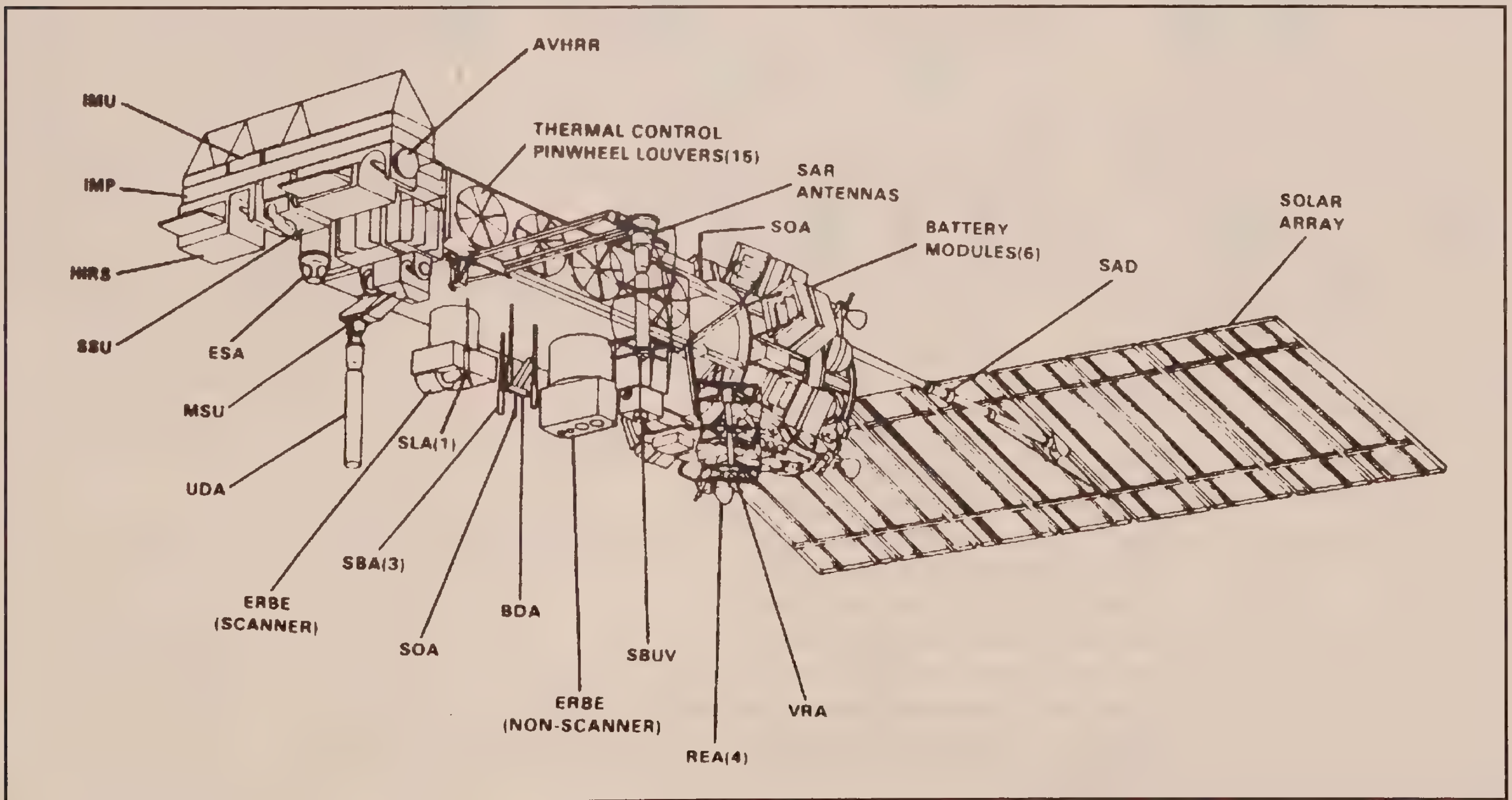
*1702.5 MHz may be used for HRPT in the event of failure of primary S-band Transmitters.

Polar Satellite Communications Link Summary

What is Involved with Weather Satellites

The two most common types of orbits used by spacecraft are the polar and geo-stationary.

A polar orbit is a low altitude orbit, or a Low Earth Orbit (LEO), in which the spacecraft passes near the Earth's poles during each revolution. The flight path is usually somewhere between a 70° and 90° angle to the equator. This angle (the satellite's inclination), is always stated in degrees. The space shuttle is often in a LEO (non-polar orbit) with an inclination of 26° to 46°. The



Advanced TIROS -N

Mir space station uses a similar LEO.

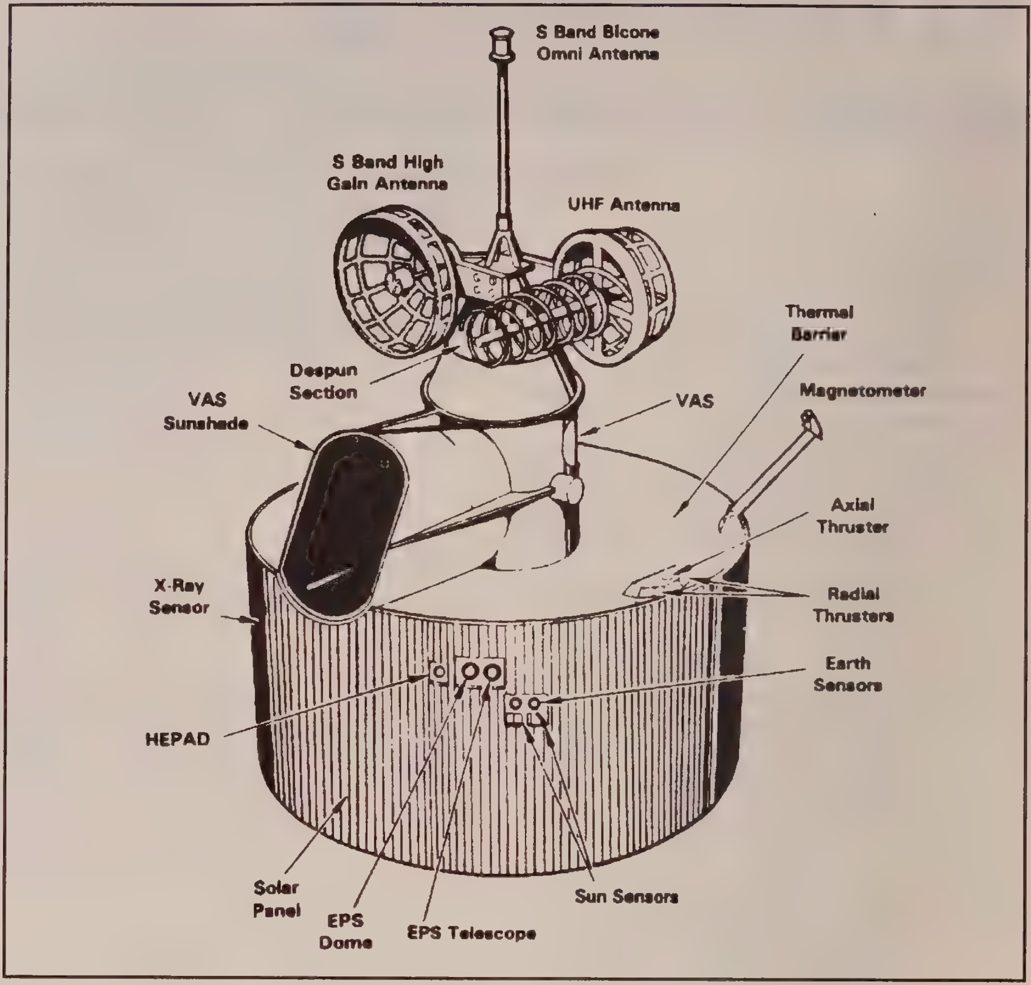
America's polar orbiting weather satellites, known as Advanced TIROS-N. They keep this name until they reach orbit, where they are then named NOAA (National Oceanic and Atmospheric Administration) with the appropriate number attached. For example, NOAA-12 was the last spacecraft to be launched in this series, and NOAA is responsible for its operations.

Russian polar orbiting weather satellites are called Meteor, and also use number identifiers. Current satellites include Meteor 3-5, Meteor 2-21, and Meteor 3-6.

Polar orbiting satellites transmit images in Automatic Picture Transmission (APT), which are transmitted in the 137 MHz band. You will need an outside twist antenna or discone with a preamp if you want to display these images. The stronger the received signal, the better the images you can produce. A processor is needed to change satellite data into information a computer can use. This also requires special software which we will look at in future columns.

Learning about HF WEFAX

If you currently receive and/or display HF WEFAX, the satellites may confuse you. WEFAX is the method which transmits weather maps. On HF, the station trans-


S Band Bicone Omni Antenna
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UHF Antenna
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VAS
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X-Ray Sensor
Radial Thrusters
Earth Sensors
HEPAD
Solar Panel
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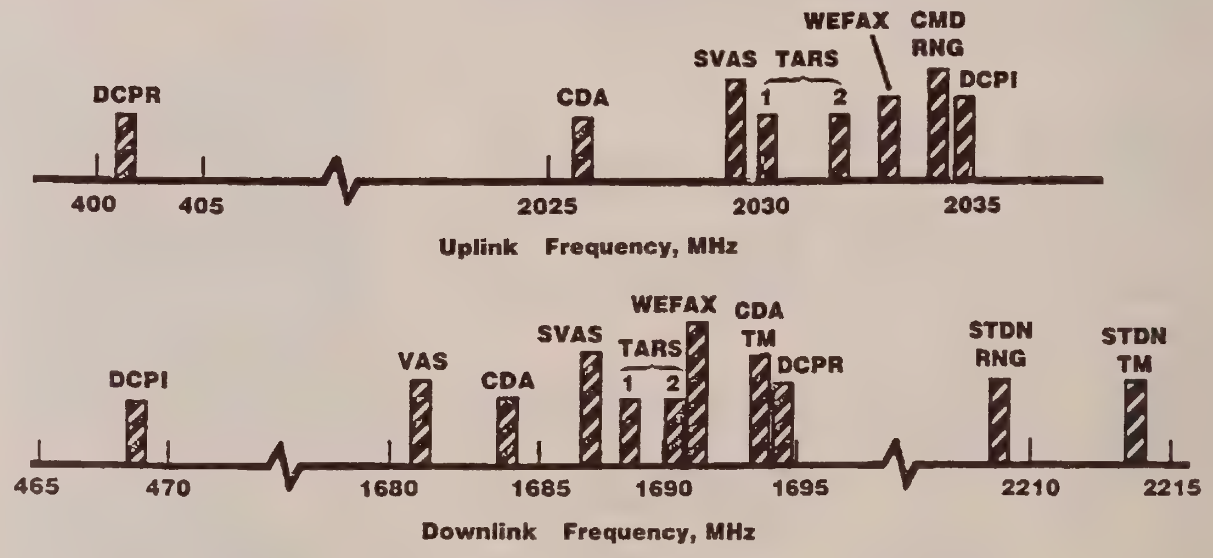
EPS Telescope
Sun Sensors

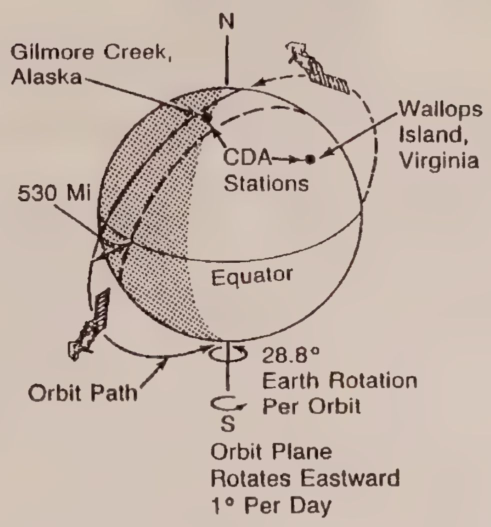
GOES Satellite

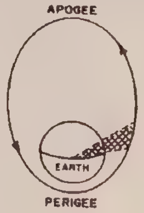


VAS – VISSR Atmospheric Sounder
DCPR – Data Collection Platform Receiver
DCPI – Data Collection Platform Interrogate
CDA – Command and Data Acquistion
SVAS – Stretched VAS Relay Channels
TARS – Tracking and Ranging System
WEFAX – Weather Facsimile Service
CMD RNG – Command and Ranging
STDN RNG – Spaceflight Tracking and Data Network Ranging
STDN TM – Spaceflight Tracking and Data Network Telemetry

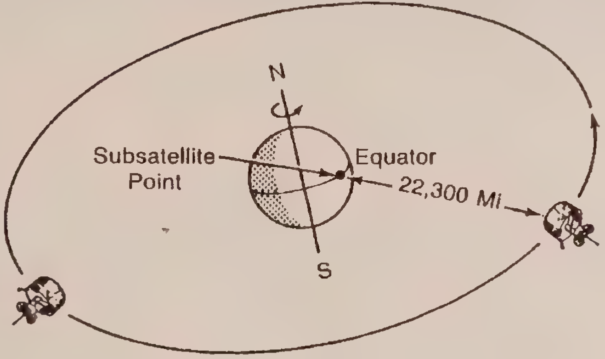
GOES Uplink and Downlink Frequency Spectra

Polar Orbiting Satellites





Geostationary Satellites



mitting WEFAX uses an AM carrier and super-imposes the images on this carrier by way of FM. You need a processor that will pull the FM off the AM carrier. When dealing with satellites, these two modes are reversed. The signals from the spacecraft are in FM with the images super-imposed in AM. Your processor should be switchable between AM and FM, and the WEFAX processor or interface should be connected between your receiver and computer.

WEFAX satellite transmissions are near 50 kHz wide, but most standard scanners cannot be used to receive APT unless they are modified. Some top-of-the-line receivers like ICOM, AOR, have adjustable IF's (Intermediate Frequency), and can adjust the receivers' bandwidth to match the width of the transmitted signal.

Geo-stationary weather satellites, like television satellites, are orbiting at 22,300 miles above the equator. They seem stationary because at this altitude they can travel at the same speed that the Earth turns. American geo weather satellites transmit images on 1691 MHz (1.6 GHz), while European weather satellites transmit on 1694 MHz. American spacecraft are known as GOES, an acronym for Geo-stationary Operational Environmental Satellites. If you refer to the GOES frequency spectra chart, you will notice the vital data

Weather Satellites

Frequency	Satellite	Country
137.300 MHz	Meteor	Russia
137.400 MHz	Meteor	Russia
137.500 MHz	NOAA 10/12	USA
137.620 MHz	NOAA 9/11	USA
137.795 MHz	FENGYUN	China
137.850 MHz	Meteor	Russia

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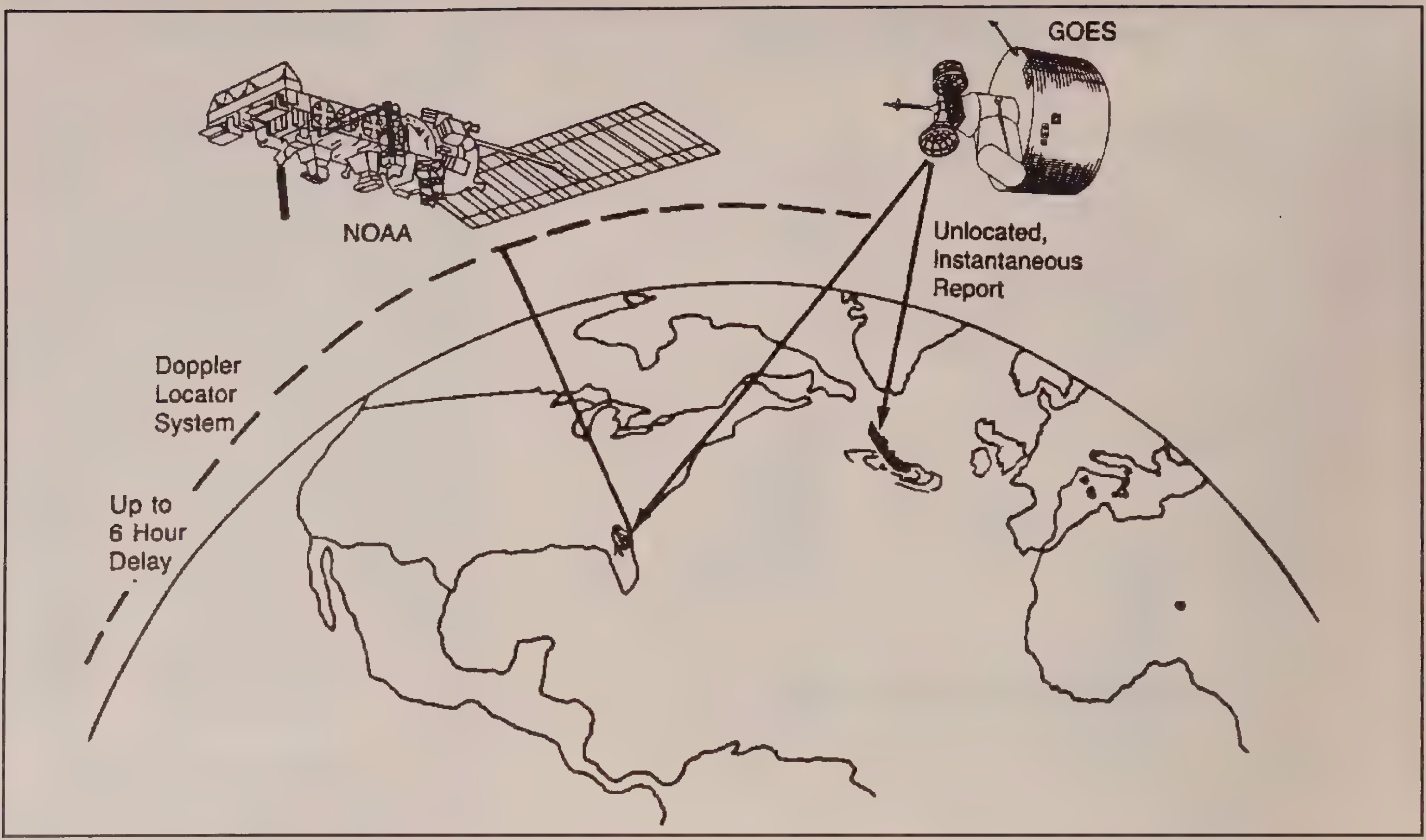

Fundamental Geostationary satellite products Search and Resue

these satellites produce. However, at this point we are only concerned with the WEFAX channel.

Don't panic when you see the 1.6 GHz frequency, and you will not have to buy another receiver. Since we will use a downconverter to change the 1.6 GHz signal to a 137 MHz signal, you can use the same receiver used for the polar orbiting satellites. You will, however, need a satellite dish at least six feet in diameter. Some have used a four foot dish with limited success. Next, you need a feed horn for the dish antenna. We will construct the feed horn from instructions in the *Weather Satellite Handbook*, by Ralph Taggart.

To display weather maps you will need an interface and software. Most manufacturers include software with their processors. The processor is connected to your IBM compatible computer and displayed on a screen or printer. We will discuss the hardware and software later in this series.

If you already own a TVRO system there is another way to display weather maps. Spacenet 3, transponder 17 transmit weather maps, which can be intercepted and displayed. To display weather maps, tap into the video or baseband output jack in back of your satellite receiver. When you tune to transponder 17, notice the picture is blank. This is due to the audio which contains information making up the weather maps. The audio is also where the video is usually found on a regular television channel. Since information is in AM mode, your HF WEFAX processor will not work unless it is switchable between FM and AM. Audio information from the receiver's baseband output is sent directly into the antenna jack of your shortwave receiver by 50 ohm coax. (*See *Warning* below.) Your receiver must be in the AM mode and you need to tune to 1.883 MHz or 1.928 MHz. These are two separate weather maps. Next, feed the audio from your shortwave receiver into a WEFAX processor, then into a computer which will display the maps on a monitor or printer. Another option is to feed your shortwave radio's audio into Infotech M-800 (or similar decoder) which will display the weather maps on a printer.

Next month we will begin putting together a weather satellite station, looking at receivers, and showing you how to convert a Radio Shack scanner into a weather satellite receiver with a .01 mfd capacitor. See ya' next month!

**WARNING*

Any time you pull a signal off a TVRO coax line, LNB, or broadband output of the receiver, you *must* use a through-tap to protect your equipment from DC voltage that might be on he line. We will show you how to build one in a future edition, or you can visit your Radio Shack store and ask for one. ■

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HOW I GOT STARTED

Emanuel Travares Filho, of Rio De Janeiro, Brazil, unofficially began SWL'ing in 1945, and he still enjoys the radio hobby in the 1990s.

Popular Communications invites readers to submit, in approximately 150 words (more or less), how they got started in the communications hobby. They should preferably be typewritten, or otherwise easily readable. If possible, a photo of the submitter should be included.

Each month we will select one entry and run it here. You need submit your entry only once, we'll keep it on file. All submissions become the property of Popular Communications, and none can be acknowledged or returned. Entries will be selected for use taking into consideration if the story they relate is especially interesting, unusual, or even humorous. We reserve the right to edit all material for length and grammar, and to improve style.

The person whose entry is selected will receive a one-year gift subscription (or one-year subscription extension) to Popular Communications.

Address all entries to: How I Got Started, Popular Communications, 76 North Broadway, Hicksville, NY 11801.

Our September Winner

This month's winner comes from "south of the border." Emanuel Travares Filho, of Rio De Janeiro, Brazil, tells his story:

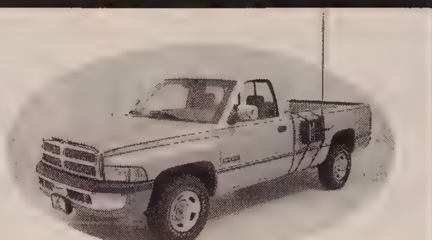
"Officially I consider 1957 the year I started in shortwave—my first QSL confirmation (*Radio Budapest*) is dated that year. However, my first 'steps' in SWL'ing were taken around 1945.

"While living in a small city in Rio De Janeiro, my father was a radio man in charge of the news broadcast on *Radio Cultura* (on shortwave 4955 kHz), in Campos.

"I remember him listening to foreign stations on shortwave to learn what was happening in the world, and then he would relay it on his news program. I myself, was also 'listening' for those strange signals and asking him what they were.

"Years later, around 1956 or 1957, I started officially tuning and reporting the shortwave and medium wave stations. I remember some interesting ones, including the *Radio Espana Independiente*, a clandestine of Spain, as well as the Fidel Castro clandestine in Sierra Maestra, among other interesting catches at that time.

"Later in 1962, I got my Ham ticket and my PY1NEW call sign. Now I am active both as a Ham and as a SWL. I very much enjoy the radio hobby." ■



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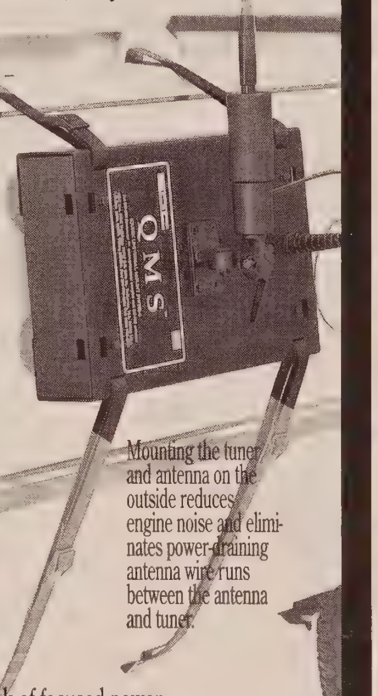

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CIRCLE 85 ON READER SERVICE CARD

BY DON SCHIMMEL

COMMUNICATIONS CONFIDENTIAL

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

In a note from Dave Sabo, Korea, he referred to a logging which appeared in the March 1994 column. The item, sent by Basil Shelley, CA, concerned a submarine base calling TWR771 on 8296 kHz. At the time I couldn't locate any ID info. Upon receiving Dave's note, I again began searching through my reference materials and this time I did find some details. TWR771 is a 100 foot long torpedo weapon retriever. The vessel has a stern recovery ramp, can carry 17 tons of torpedoes, and is manned by 15 enlisted personnel. Seven of this type were built between 1969 and 1970 by Peterson Builders, Sturgeon Bay, WI.

QSL opportunities continue to shrink with base and unit closures. The Clinton FY 1995 budget only covers new construction of a nuclear powered aircraft carrier and three Aegis missile destroyers. This is the least number of new United States Navy vessels in 45 years!

I just received a book I ordered from the Naval Institute Press entitled, *Dictionary of Military Abbreviations*. I have already referred to it a number of times to sort out some abbreviations I ran across while logging some Navy activity. To order information, write the Naval Institute Press, 118 Maryland Avenue, Annapolis, MD 21402.

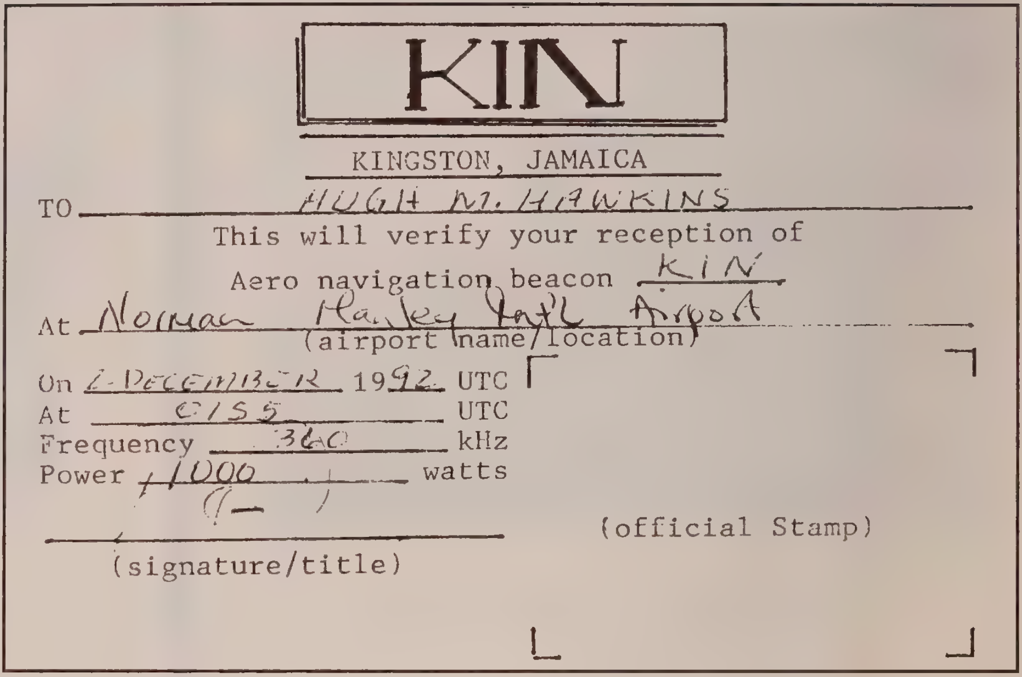
Perry Crabill, VA, reports his beacon total since January 1990, is now 923. His list includes two new Cubans and a new stations in Colombia, along with two un-IDs he thinks are also in Cuba.

John T. Wible, TX, who recently acquired a Transworld TW100 transceiver, uses it mainly to monitor various aeronautical airway stations communicating with aircraft on oceanic flights. "I record the lat/long position figures, then bounce these against San Antonio coordinates on a geographic program. The resulting distance is entered and... is quite accurate. My best 'shot' so far has been a Singapore 747 on 16 March. Based on coordinates, the plane was around 5,200 miles away."

From Zacharias Liangas, Greece, we learned he is a DXer of nearly all types of SW signals. He sent in a batch of utility loggings this month and we look forward to receiving more in the future.

Patrick Privat, France, indicated he obtained his loggings with a portable Panasonic RF-B45 with a telescopic antenna.

Simon Mason, England, wrote that Jonathan Marks has a whole "Media Network" program dedicated to the Kulpsville Winter SWL Festival. He said the program is very interesting. Simon also mentioned he had visited Lowe Electronics and was impressed with their receivers.



KIN

KINGSTON, JAMAICA

TO HUGH M. HAWKINS

This will verify your reception of

Aero navigation beacon KIN

At Norman Manley Int'l Airport
(airport name/location)

On 2-DECEMBER 1992 UTC

At 0155 UTC

Frequency 360 kHz

Power 1000 watts

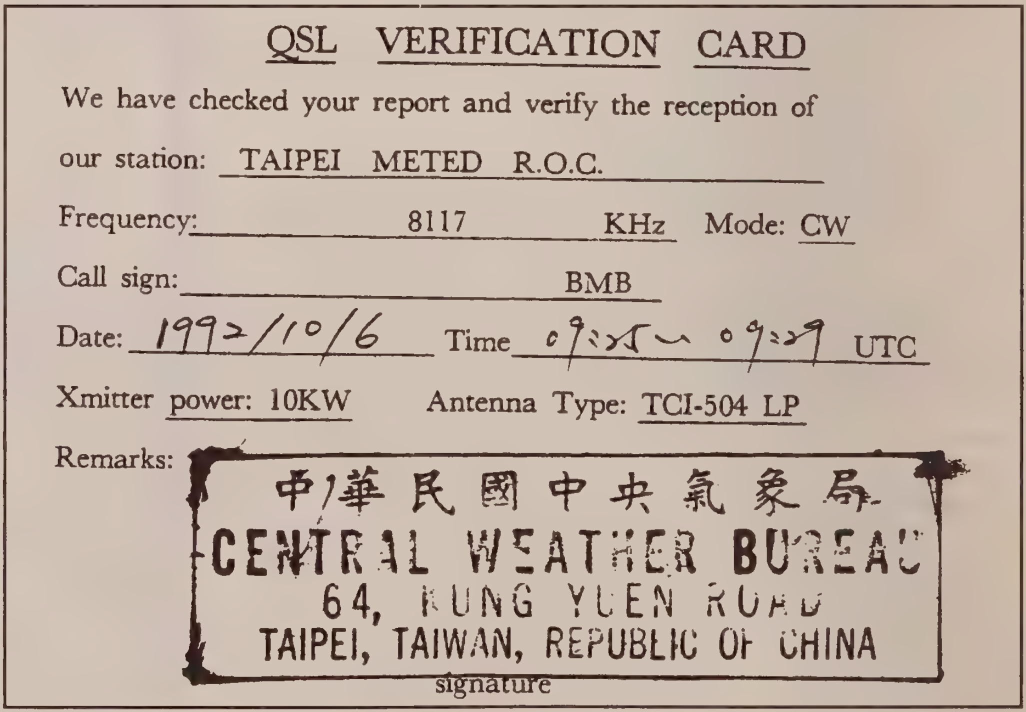
(signature/title)

(official Stamp)

Hugh Hawkins, MS, shares his PFC with readers.

According to information received from Richard Baker, OH, contracts have been awarded for construction of some seagoing buoy tenders (WLB's) for the U.S. Coast Guard, the first of these to be delivered in late 1994. Also, contractors have been awarded for some coastal buoy tenders (WLM's). First delivery is scheduled for mid-1995. Sometime in 1997, delivery is expected of the Polar Icebreaker USCGC Healy (WABG-20).

Earlier this year, NMN commenced using the title of CAMSLANT Chesapeake in place of CommSta Portsmouth. Upon making the change, NMN spent the first several weeks constantly correcting cutters and aircraft when working NMN. Although NMC, San Francisco, CAMSPAC (Commu-



QSL VERIFICATION CARD

We have checked your report and verify the reception of

our station: TAIPEI METED R.O.C.

Frequency: 8117 KHz Mode: CW

Call sign: BMB

Date: 1992/10/6 Time 09:25 ~ 09:29 UTC

Xmitter power: 10KW Antenna Type: TCI-504 LP

Remarks:

中華民國中央氣象局
CENTRAL WEATHER BUREAU
64, KUNG YUEN ROAD
TAIPEI, TAIWAN, REPUBLIC OF CHINA

signature

QSL received by Hiroshi Saito, Japan.

nications Area Master Station Pacific) has long used its status title, Portsmouth continued use of the CommSta title. It's unclear why the NMN change came about.

Richard concluded his report with an item describing a limited mobility platform call "Sea Shadow." Lockheed Missile and Space Co. (LMSC), and the U.S. Navy are testing the device in battle group operations off the coast of Southern California.

Utility monitors may have noted mention of the "Sea Shadow" in U.S. Navy communications in past months.

FSK Morse transmissions sounding like ETFNJX TKAGAS have been noted quite often on frequencies such as 16873 kHz at 1426 UTC, 14811 at 1800, 14461 at 1545, and 14622 at 1555.

One day while I was copying RTTY traffic to station SPK on 21865 kHz at 1600 UTC, the transmission stopped and the ETFNJX TKAGAS sequence was sent in FSK Morse for a few minutes. It stopped, and the RTTY traffic restarted. SPK and others who receive similar enciphered/encoded traffic have been identified as being part of a Russian MFA network.

If you should travel to the Washington DC area, you may want to visit the Museum of National Security Agency (NSA). Yes, that's right. There is a National Cryptological Museum, and it is open to the public, if you can find it. It is housed in a former motel located on a road behind a Shell station just off Route 32 (Maryland). Exit the Baltimore-Washington parkway east on Route 32. As you approach the station you will spot the museum because it is surrounded by a high chain link fence topped with barbed-wire. The Museum hours are 9 a.m. to 3 p.m., Monday through Friday. There are crypto machines on display, plus other interesting cryptographic related items.

Abbreviations Used For Intercepts

AM	Amplitude Modulation mode
BC	Broadcast
CW	Morse Code mode
EE	English
GG	German
ID	Identification/led/location
LSB	Lower Sideband mode
OM	Male operator
PP	Portuguese
SS	Spanish
tfc	Traffic
USB	Upper Sideband mode
w/	With
wx	Weather report/forecast
YL	Female operator
4F	4-figure coded groups (i.e. 5739)
5F	5-figure coded groups
5L	5-letter coded groups (i.e. IGRXJ)

UTE Intercepts. All Times in UTC.

204: Beacon TWL, Monroe, NC, at 0520. (Crabill, VA)

205: Beacon COR, Corcoran Salyer Farms, CA at 0444. (Vaage, CA)

208: Beacon SSN, Romulus, NY at 0525. (Crabill, VA)

220: Beacon HUR, Hurdle Mills, NC at 0559. (Crabill, VA)

226: Beacon FAF, Ft. Eustis, VA at 0701. (Crabill, VA)

227: Beacon CPC, Whiteville, NC at 0818. New; GDX off The air. (Crabill, VA)

230: Beacon UCL, Cayo Largo del Sur, Cuba at 0718. 1400 Hz, or 231 kHz at 400 Hz; Beacon HSB, Harrisburg, IL at 1146; Beacon YBM, u/i 400 Hz; Canadian? (Crabill, VA)

239: Beacon SAR, Sparta, IL at 1042, 400 Hz. (Crabill, VA)

242: Beacon HHY, Savannah, TN at 1048. (Crabill, VA)

245: Beacon TLR, Tulare Municipal-Medford Field, CA at 0445. (Vaage, CA)

248: Beacon BF, Cleveland, OH at 0812. (Crabill, VA)

266: Beacon YFH, Fort Hope, Ont., Canada at 0958. New ID, ex-YDD. (Crabill, VA)

282: Beacon GWF, Lancaster Fox Field, CA at 0439. (Vaage, CA)

283: Beacon UZG, Zaragoza, Cuba at 1028. 1000 Hz DSB. (Crabill, VA)

300: Beacon ABL, Ambalema, Colombia at 0416. DSB; SSB in Guide. (Crabill, VA)

315: Beacon USW ??? at 0446. 1000 Hz DSB; ex-USR??? (Crabill, VA)

329: Beacon ISM, Kissimmee, FL at 0525. (Crabill, VA)

335: Beacon SR, u/i at 0956. 1000 Hz. (Crabill, VA)

340: Beacon JES, Jessup, GA at 0601. New freq; ex-23. (Crabill, VA)

344: Beacon FCH, Fresno Chandler Municipal, CA at 0450. (Vaage, CA)

356: Beacon TY, u/i at 0611. 400 Hz; Canadian??? (Crabill, VA)

366: Beacon HXM, Hazlelton, PA at 1015. (Crabill, VA)

367: Beacon GR, Fayetteville, NC at 1019. (Crabill, VA)

368: Beacon BEQ, Bessemer, AL at 1056. (Crabill, VA)

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- ARQ-E/ARQ1000 Duplex
- ARQ-N-ARQ1000 Duplex Variant
- ARQ-E3-CCIR519 Variant
- POL-ARQ 100 Baud Duplex ARQ
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- TDM342/ARQ-M2/4
- FEC-A FEC100A/FEC101
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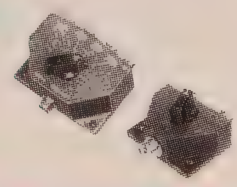

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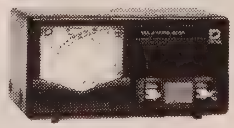

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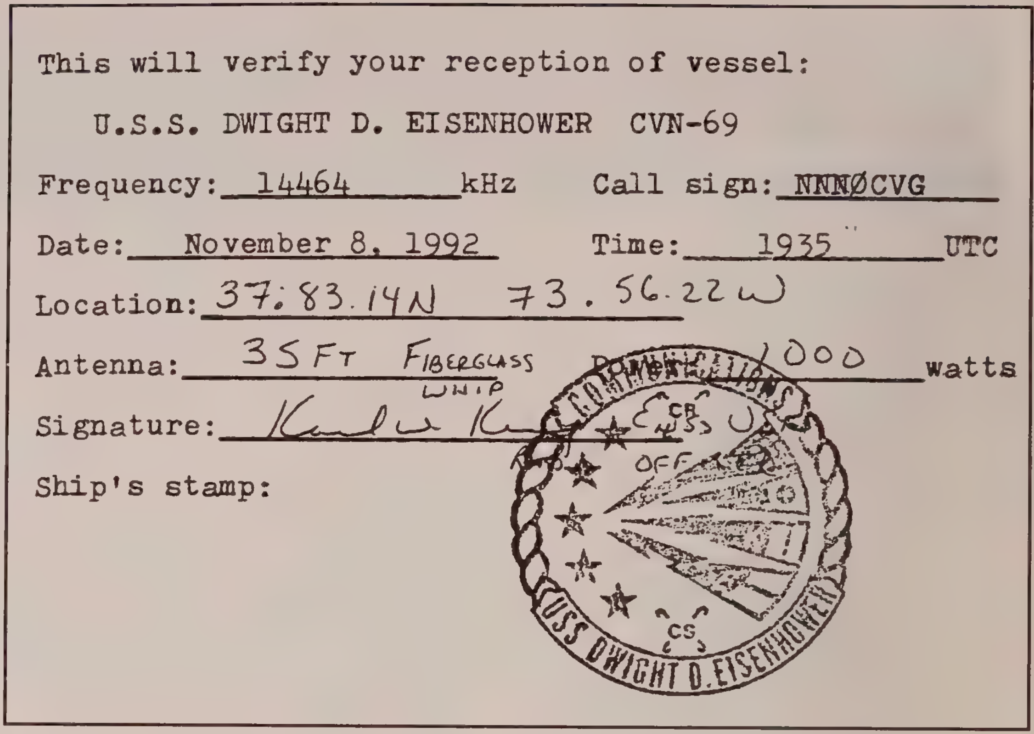

This will verify your reception of vessel:

U.S.S. DWIGHT D. EISENHOWER CVN-69

Frequency: 14464 kHz Call sign: NNN0CVG

Date: November 8, 1992 Time: 1935 UTC

Location: 37.83.14N 73.56.22W

Antenna: 35FT Fiberglass Whip Power: 1000 watts

Signature:

Ship's stamp:

PFC used by Russ Hill, MI, for his reception report sent to NNN0CVG.

370: Bacon PAI, Pacoima Barton Heliport, CA at 0441. (Vaage, CA)

371: Beacon AI, Anderson, IN at 1015. (Crabill, VA)

375: Beacon RCZ, Rockingham, NC at 1046. (Crabill, VA)

376: Beacon LC, u/i at 0445. 1000 Hz. (Crabill, VA)

382: Beacon MW, Marion, IL at 1046. (Crabill, VA)

394: Beacon DTE, Dayton, TN at 0531. (Crabill, VA)

401: Beacon OX, u/i at 0512. (Crabill, VA)

408: Beacon ECX, u/i at 0537. 1000 Hz, slow ID; peaks N/S. (Crabill, VA)

415: Beacon OAS, u/i at 0556. 400 Hz. (Crabill, VA)

450: Beacon PPA, u/i at 0532. 1000 Hz DSB; peaks N/S; Cuba?? (Crabill, VA)

2003: LFO, Orlandet, Norway announcing nav wrngs at 2133. All USB. (Boender, Netherlands)

2182: FFU, Brest, France announcing navigational warnings on 1635 kHz at 2003; LFO, Orlandet, Norway announcing nav wrngs at 2133. All USB. (Boender, Netherlands)

2716: "Foreclose (?)-40" (W/British accent) clg AUTEC Ops. Adv QSY UHF 299.4 MHz. AUTEC is Atlantic Underwater Testing and Evaluation Center, private contractor for USN. Hrd at 0935. Then Snapper-4 hrd w/AUTEC Ops at 0937. Snapper calls are assigned to torpedo retriever ships. Above hrd in USB mode. (Baker, OH)

2743: Mossad station w/5L grps at 2253. (Liangas, Greece)

3150: Mossad station PCD w/5L grps at 2245. (Liangas, Greece)

3231: YL/GG at 2224 w/5F grps. (Liangas, Greece)

3413: San Francisco ATC w/Delta 16, clearance to FL 360 at 0748. Reports level at 360 at 0752; same ATC w/Northwest 907 at 1223 and Delta 185 at 12390. Both w/position report. Honolulu ATC w/American 102 at 0757 and Canadian 34 at 1240. Both w/position report. (Wible, TX)

3842: Mossad station w/5L grps at 2317. (Liangas, Greece)

4023: US Army MARS net hrd at 0423. AAR9BL was net control. (Shelley, CA)

4090: Alpha, passing contact report to Foxtrot Mike re P3FR3, vessel Mersun at 0454. Foxtrot w/same at 0507 to FM for HMQR5, vessel Irma. At 0723, Delta w/FM advises is two miles & closing on ship that has deviated from lay-to-position, Captain of ves not responding to bride-bridge comms, refuses to turn back. Later closed & found track ID's were wrong, and proper ship ID heading to lay-to position. UN Haiti embargo ops in USB mode. (Baker, OH)

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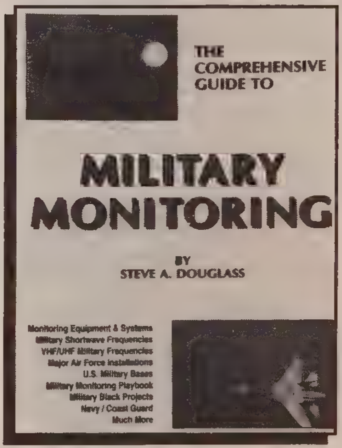

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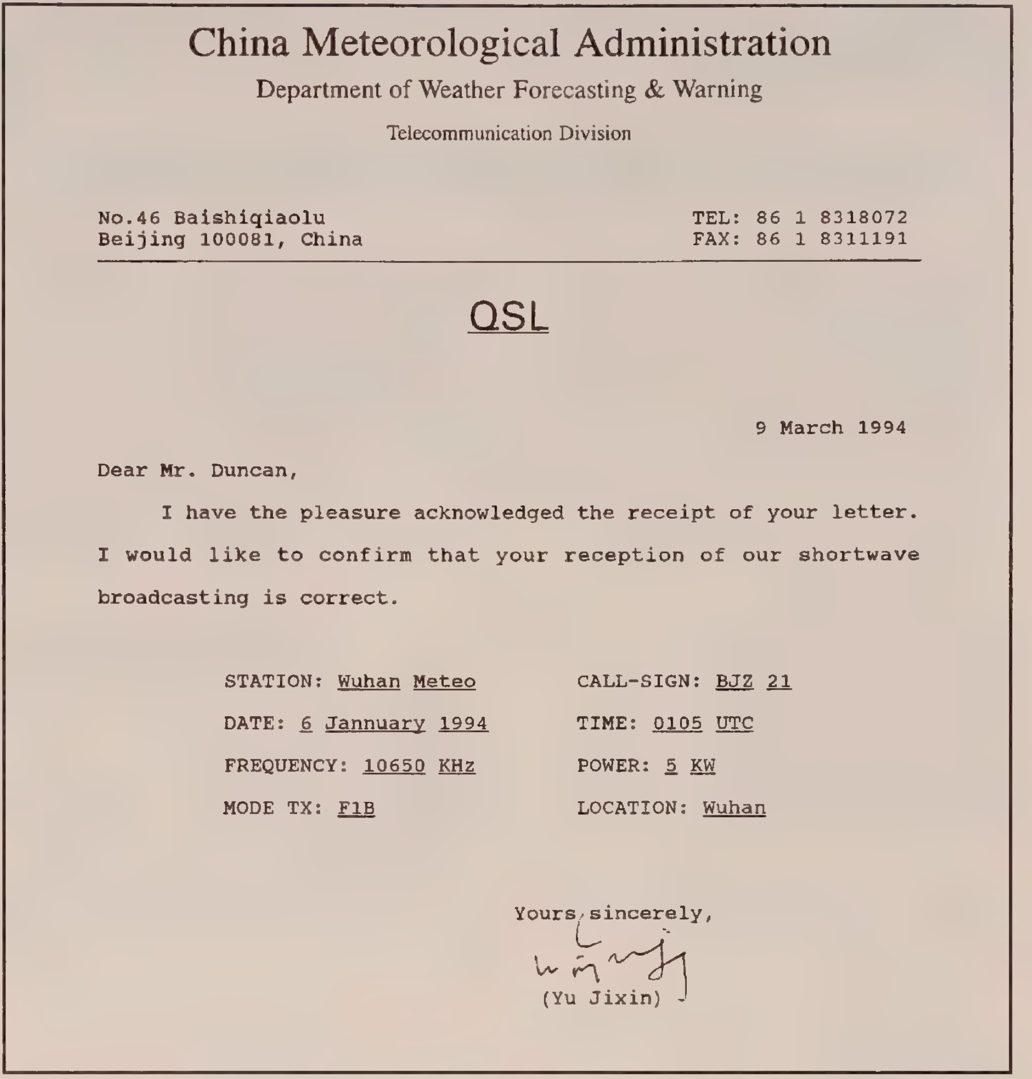

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Department of Weather Forecasting & Warning

Telecommunication Division

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Beijing 100081, China

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FAX: 86 1 8311191

QSL

9 March 1994

Dear Mr. Duncan,

I have the pleasure acknowledged the receipt of your letter. I would like to confirm that your reception of our shortwave broadcasting is correct.

STATION: Wuhan Meteo
CALL-SIGN: BJZ 21
DATE: 6 Jannuary 1994
TIME: 0105 UTC
FREQUENCY: 10650 KHz
POWER: 5 KW
MODE TX: F1B
LOCATION: Wuhan

Yours sincerely,

(Yu Jixin)

From Thomas Duncan, GA, we received this copy of the QSL sent to him by a Chinese Meteo station.

4113: ELOU5, cruise ship M/V Zenith at 0434 wkg WOM (on 4402 kHz) for R/t tfc in USB. (Baker, OH)

4130: Everyday at 2100, YL rptng 'Mary Susan Adam." At 2105 'Nancy Robert 22.,' 'George Robert 10' & Then OM came on w.5L grps used in ARRL 1948 guide, e.g. Adam, Baker, Charlie, etc. (Mason, England)

4545: U/i w/5F grps in GG at 0137. (Liangas, Greece)

4562: Three note rising scale marker being sent at 2210 on Sunday. Then YL/GG w/Achtung and in to 5F grps. Frequency of this station changes monthly. Recent frequencies have been: July 93—5718; Aug.—5617; Sept.—5487; Oct.—4827, Nov.—4139; Dec.—3815; Jan. 94—4126; Feb.—4357; Mar.—4562. All in kHz. Thanks to Mike in Bath for this info. (Mason, England)

4637.5: KMG322, Rowan Oil, Houston at 0955 w/check-in of oil rigs and status of drilling reports. USB mode. (Baker, OH)

4643: Every Friday CW station sending NNN from 2100-2105 Then YL/GG w/Gruppe 20 and into 5F grps. (Mason, England)

4722: RAF channel forecast of wx for UK locations at 0025. (Liangas, Greece)

4740: YL rptng 32494 from 2130-2135. Then Ready, Ready, 19, 19, and into 5F grps. Affected by warble jammers. (Mason, England)

5300: U/i Slavic numbers station. OM opr w.5F grps at 1530. (Liangas, Greece)

5400: "GANTSEC" (USCG Greater Antilles Section, San Juan, PR) at 0052 wkg B6C who requests They go "green." USB mode. (Baker, OH)

5505: EIP, Shannon VOLMET, Ireland at 0443. (Shelley, CA)

5530: Everyday at 2000 YL w/'Nancy Adam Susan.' If no mssgs are to follow, then YL says 'Queen Robert Union.' On the other hand, if mssgs are to follow YL says 'Queen Thomas Charlie' and into 5L grps. Ends with 'Robert Adam' (reverse of AR). See logging at 4130 kHz. (Mason, England)

5547: San Francisco ATC wkg United 112 at 1150 for position report. DC10, Hawaii-SFO. Then wrks United 192 at 1151. Plane at 340 & requests return 320 due light turb/chop. Cleared to 320. (Wible, TX)

5550: New York ATC wrkd foll a/c: West Indian 604 at 0004, American 148 at 0005, Air Canada 953 at 0008, Delta 2ECB at 0010, and Britannia 552B Heavy at 0012. (Wible, TX)

5574: San Francisco ATC wrks Northwest 922 at 1202 for SELCAL check, Korean Air 002 for position report at 1238, CATO 81 re refueling acft at 1243 & gives est posit at 1255. (Wible, TX)

5658: Bombay Aero at 2345 w/Delhi & Karachi; Aden clg Addis, also tfc from Asmara Aero (Eritrea) & Khartum at 0211; Karachi clg Bangladesh 004 at 2310. (Privat, Greece)

5680: Edinburgh Rescue w/Rescue 137 for rdo check at 2051; Rescue 137 w/Coast Guard 'VA' rdo check at 2051; Plymouth Rescue w/Rescue 173 for rdo check at 12205. All in USB. (Boender, Netherlands)

6227: AADS, USAV Runneymeade (LCU-2001), wkg AAC2, Harbormaster, Ft. Eustas, VA at 0453 w/midnight position report. At 1731, ABHT, u/i USAV clg/wkg AAC2 for rdo ck. Both in USB mode. (Baker, OH0

6501: DAJ, Norddeich Radio at 0124 wkg u/i ship in EE. Not commonly hrd here. NMO, CommSta Honolulu clg WVFX, M/V Chestnut Hill at 0911 "on 6, 8, & 13 megs SCN" no joy. Both in USB. (Baker, OH)

6516: Vessel "Lucky" wkg u/i vessel WAQ4023. YL oprs w/business talk at 0129, customer to get VIP treatment! In USB mode. (Baker, OH)

6577: New York ATC wrks American 1134, B727, San Juan-Philadelphia at 2339 w/SELCAL ck; United 871 at 2347, B757, NY-Caracas, w/position report. TWA 94 clg NY at 0017 but no reply. (Wible, TX)

6628: Santa Maria ATC wrks Corsair 927 at 0236 for position report and flight level; West Indian 900 at 0359 for position report and flight level. (Wible, TX)

6679: KVM70, Honolulu Volmet giving wx for various Hawaiian Islands at 0330; KZAZ, Aukland Volmet New Zealand w/wx at 1350; JMA, Tokyo Volmet, Japan w/wx for Japanese cities at 1440; Hong Kong Volmet w/wx at 1145. (Shelley, CA)

6815: Foxtrot Charlie (CG NCS) at 0008 wkg Papa for his "whiskey" (location), fol by xray for same. USCG net for UN Haitian Ops in USB nightly. (Baker, OH)

6840: YL/SS in AM at 0314 w/4F grps. (Low, TX)

6860: OM/RR rptng 724 from 2200-2205 in AM mode. Then 835 935 92 92 and into 5F grps. (Mason, England)

6873: VOA feeder Greenville, NC at 0532. (Shelley, CA)

7535: Hrd wrking SESEF Norfolk: At 1725, USS Joseph Hewes (FFT-1078), NELP. At 1730, NTSG, USS Thomas S. Gates (CG-51) for xmtr tests. At 1740, NNTR, USS Theodore Roosevelt (CVN-71) for xmtr tests. At 1857, NMFA, USS Downes (FFT-1070) clg SESEF 7 w/long count. At 1900, NGHY, USS Peterson (DD-969) for xmtr tests. At 1907 NKXR, USNS Powhatan (T-ATF-166) for HF xmtr test. Primary mode for all The above was USB. (Baker, OH)

7741: NVAI, USCGC Valiant (WMEC-621) at 0910 wkg unk a/c & assuming his rdo guard. USCG Haiti Ops. USB mode. (Baker, OH)

8125: KDM50, FAA, Hampton, GA wkg KJK80, FAA, Leesburg, VA at 2049 w/talk of new remote being added & what call sign should be used. USB mode. (Baker, OH)

8237: At 0647, HMAS Warrnambool (P-204), VLRM, wkg Sydney Radio (ON 8761 kHz) for R/T tfc. HMAS Warrnambool is a Fremantle-class patrol boat of the Royal Australian Navy & the Reserve Training Ship at Melbourne. At 1816, M/V Longtail Express concluding R/T tfc w/WOO. All USB mode. (Baker, OH)

8240: At 0110, mystery vessel w/ID as "Diamond" wrkg NMN, CAMSLANT Chesapeake. Advises is moored Pensacola, FL due to mechanical problem. Has already passed info to squadron. Diamond hrd many times in past months. At 0201, UJUV, M/V (TH) Professor Rybaitovskij clg/wkg Portishead for R/T tfc, spelled name phonetically. At 0512, USCGC Eagle (WIX-327), CG masted training Barque, wkg NMN re HFDL freq. At 0625 C6PY, M/V Hermbnia wkg CommSta New Orleans for wx obs & said ship had just had name changed. At 1833, NNAS, USCGC Escanaba (WMEC-907) wkg NMN for pp. All USB mode. (Baker, OH)

8294: WGN8731, Tug Sea John at 0622 wkg WPE, Jacksonville w/daily report in USB. (Baker, OH)

8366: 9HH3N, M/V Bhasilia wkg unk sta at 2355 w/CW telex to Warsaw. (Baker, OH)

8568.5: XFM, Manzanillo, Mexico at 0454 w/CQ mkr. (Low, TX)

8722: WOM w/wx for Caribbean from 1400-1414. (Shelley, CA)

8776: RADFIELD (a/c) reads phonetic msg at 0423, U8P clg 13M for rdo ck. At 0426, P-zero-Q w/13M advises execute exercise Iron Beard. USN HICOM Eastern/Mid-Pac secondary. USB mode. (Baker, OH)

8785: VCS, Halifax CG w/tfc list at 0133. (Shelley, CA)

8846: New York ATC wkg Virgin 006 at 0104 w/position & flight level info. American 62, B767, Miami-Paris, w/position report at 0107. Aruba 725 at 0107 w/position & FL info & American 020 at 0112 w/psn report. (Wible, TX)

8858: Air France 239 at 0312 w/Dakar Aero he has just crossed AF 240 (Paris-Rio). Dakar at 0313 w/Lufthansa 527 (Santiago-Buenos Aires-Frankfort). (Privat, Greece)

8863: Russian Volmet w/wx for various places. Hrd at 0100. (Liangas, Greece)

8960: Shannon w/wx forecasts. OM opr. Hrd 2200 in USB. (Liangas, Greece)

9017: Card Game clg Night Watch at 1413. Night Watch 01 clg Night Watch is a National Emergency Airborne Command Post (NEACP) program identifier. (Ed.)

9063: YL/GG w/196 rptd at 1930 in AM mode. Then at 1930 372 x2 50 x2 and into very slow 5F grps with a pause after each zero. Ended w/00000. (Mason, England)

9402: Mossad station w/5L grps in ISS at 1230. (Liangas, Greece)

10353: SYN2, Mossad station at 1032. (Liangas, Greece)

11176: Reach 11T4 w/Incirlik, pp to Ramstein at 0938; Reach 50280 w/Incirlik, pp to Hilda East at 1010 re maintenance problem; Blue 34 w/Croughton at 1040; Armco 69 w/Croughton, pp to Incirlik at 1555; Simra 69 w/Croughton requests wx for Lajes 1516 (same a/c as Armco 69, now on a mission out of Rota AFB), a/c type is C-130. Hrd at 1525. All USB mode. (Boender, Netherlands)

11217: Frankfurt LDOC w/unid a/c at 0945 in USB w/pp to Geneva. (Boender, Netherlands)

11387: Sydney Volmet at 0700 giving wx for Sydney, Melbourne, Adelaide, Perth, Darwin, Townsville, & Brisbane. (Privat, Greece)

12070: US Army Corps of Engineers net at 1530. At 1535 QSY'd to Channel 12 (16077 kHz). (Low, TX)

12300: YL/SS passing 2/3F grps at 0200. (Shelley, CA)

13306: New York ATC w/American 69, a/c unable climb to FL 390 due weight. Hrd at 1652. NY w/American 57 at 1657, B767, London-Miami, w/position report & FL info. (Wible, TX)

13113: Canadian CG station in Halifax, NS w/ice reports 1335-1342. Also at 2335. (Shelley, CA)

13446: WGY908, FEMA District 8, Denver, at 1748 wkg WGY911, FEMA HQ, Washington, DC for test comms on "36" in USB. Shifted to "51" (16201 kHz) at 1749. (Baker, OH)

14366: U/i auto CW stn at 1351 w/5F grps. Cuts zero as T. Signal has slight echo. At completion of msg sends TTT TTT. Down at 1356. (Ed.)

14423: YL/EE w/1-0 count and 881 from 1500-1510. After 10 tones Count 225 and into 3/2F grps. (Mason, England)

14441.5: At 0049 NNN0CNY, USCGC Campbell (WMEC-909) clg ASSMS (any stateside MARS station), NNN0UTO answers. At 0108 NNN0NZZ, USS Kitty Hawk (CV-63) clg ASSMS, NNN0FMN answers, QSY 14483.5 kHz. At 0110, NNN0CYU, USCGC Vigilant (WMEC-617) clg ASSMS, at 0115 NNN0VGW (in Mobile, AL) answers, QSY 14467 kHz. At 0113, NNN0COR, USS Hunley (AS-31) wkg NNN0CYU. At 0128, NNN0CYJ, USS Stark (FFG-31) clg ASSMS. NAVMARCORPMARS (USN MARS) clg in USB. (Baker, OH)

14720: U/i Auto CW station at 1441 w/very fast 5F grps. Zero cut as T. Sign off w/TTTTT. (Ed.)

14730: U/i station w/OM/RR giving 5F grps at 1354. (Liangas, Greece)

15683: Lincolnshire Poacher station at 1315 w/5L grps. (Liangas, Greece)

16270: Number station. 5F grps in English w/German accent at 1350 in AM. (Boender, Netherlands)

16384: WOM, Pennsuco, FL (Channel 1609) w/simplex pp at 1630. Also comms re LA earthquake that had occurred earlier. (Low, TX)

16968: PPL, Belem, Brazil in CW w/V & QSX mkr at 1811. (Baker, OH)

16986: CTP. NATO Lisbon, Portugal in CW at 1829 w/VVV mkr. (Boender, NeTherlands)

17260: WLO, Mobile, AL at 0011 w/wx for Gulf of Mexico. Hrd from 000-0011. (Shelley, CA)

17281: BVA, Tapei, Taiwan at 0100. (Shelley, CA)

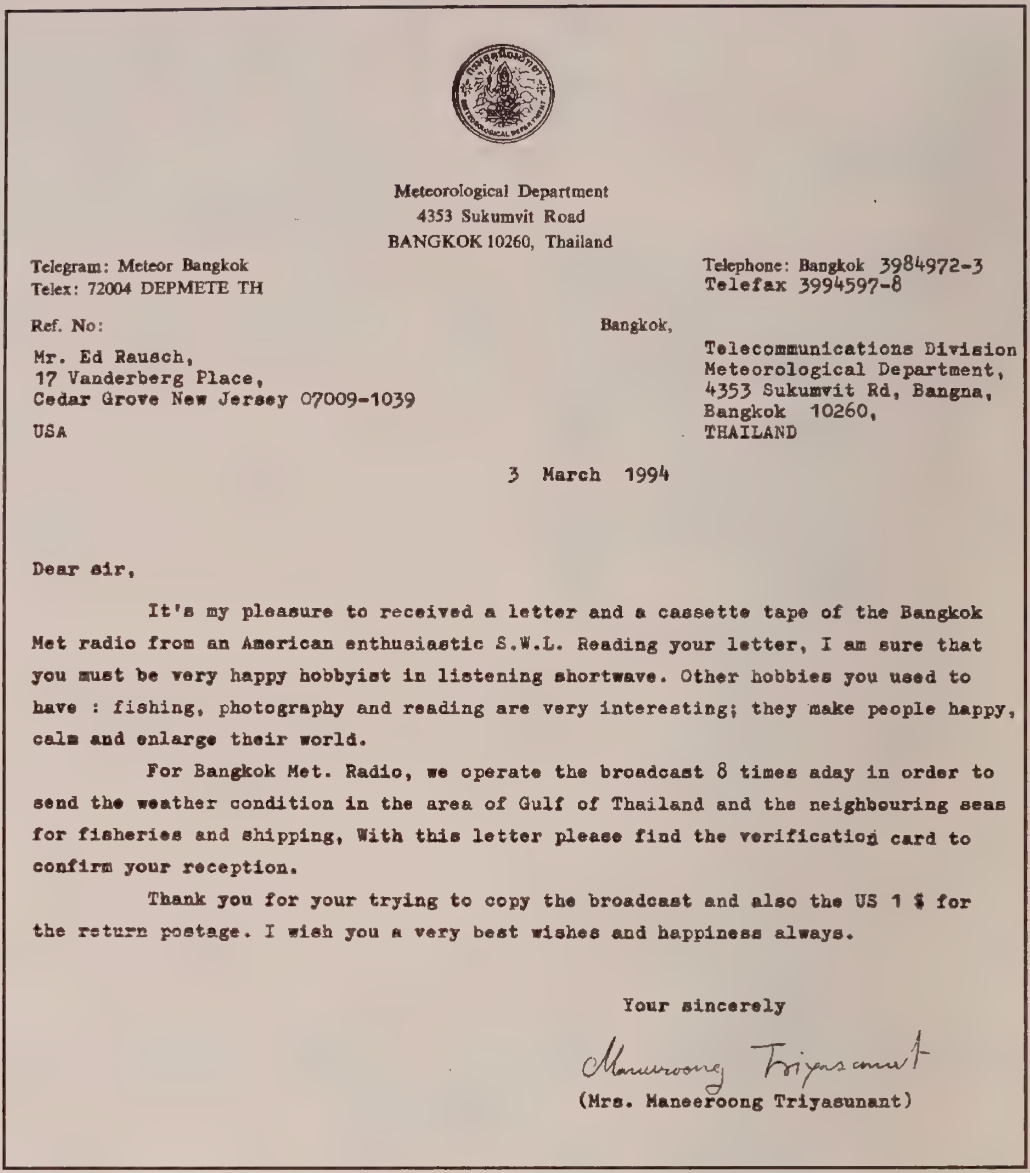
22476: DAM, Norddeich Radio at 1705 w/V mkr in CW. (Baker, OH)

22711: GKE76, Portishead Radio at 1728 in USB concluding R/T tfc w/HMS Norfolk in USB. (Baker, OH)

28245: WA6APQ beacon located Long Beach, CA. Hrd at 1830. (Low, TX)

28260: KA1NSV beacon located Cape Cod, MA. Hrd at 1736. (Low, TX)

28280: NO6J beacon located Thousand Oaks, CA. Hrd at 1820. (Low, TX)



Meteorological Department
4353 Sukumvit Road
BANGKOK 10260, Thailand

Telegram: Meteor Bangkok
Telex: 72004 DEPMETE TH

Telephone: Bangkok 3984972-3
Telefax 3994597-8

Ref. No:

Bangkok,

Mr. Ed Rausch,
17 Vanderberg Place,
Cedar Grove New Jersey 07009-1039
USA

Telecommunications Division
Meteorological Department,
4353 Sukumvit Rd, Bangna,
Bangkok 10260,
THAILAND

3 March 1994

Dear sir,

It's my pleasure to received a letter and a cassette tape of the Bangkok Met radio from an American enthusiastic S.W.L. Reading your letter, I am sure that you must be very happy hobbyist in listening shortwave. Other hobbies you used to have : fishing, photography and reading are very interesting; they make people happy, calm and enlarge their world.

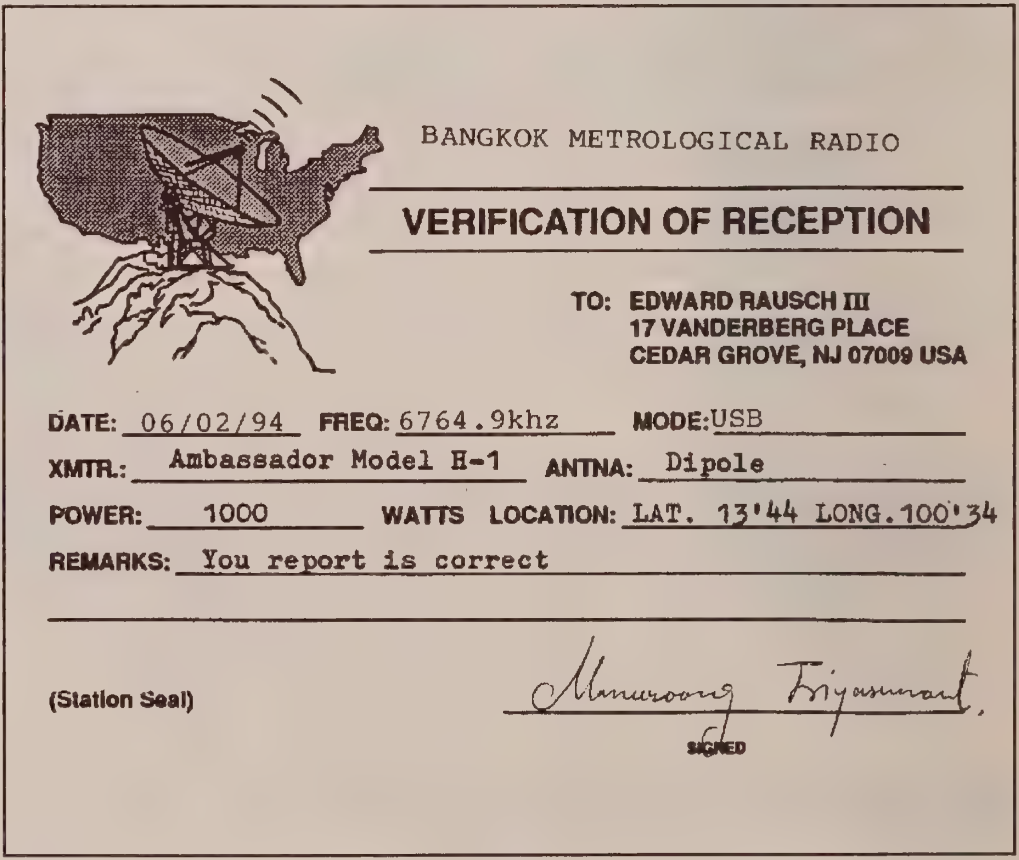
For Bangkok Met. Radio, we operate the broadcast 8 times aday in order to send the weather condition in the area of Gulf of Thailand and the neighbouring seas for fisheries and shipping, With this letter please find the verification card to confirm your reception.

Thank you for your trying to copy the broadcast and also the US 1 $ for the return postage. I wish you a very best wishes and happiness always.

Your sincerely

Maneeroong Triyasunant

(Mrs. Maneeroong Triyasunant)



BANGKOK METROLOGICAL RADIO

VERIFICATION OF RECEPTION

TO: EDWARD RAUSCH III
17 VANDERBERG PLACE
CEDAR GROVE, NJ 07009 USA

DATE: 06/02/94 FREQ: 6764.9khz MODE:USB
XMTR.: Ambassador Model H-1 ANTNA: Dipole
POWER: 1000 WATTS LOCATION: LAT. 13'44 LONG.100'34
REMARKS: You report is correct

(Station Seal)

Maneeroong Triyasunant
SIGNED

Ed Rausch, NJ, received this letter with the return of his PFC.

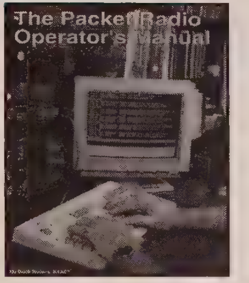
CQ Books and Videos

The Quad Antenna

The Quad Antenna

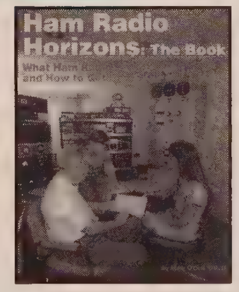
Hams love antenna books and this book is no exception. Written by world renowned author Bob Haviland, W4MB, The Quad Antenna is the authoritative technical book on the design, construction, characteristics and applications of Quad Antennas. Discover how to easily build a quad antenna for your station that will help you fill your logbook with rare DX that you have only dreamed about before. **Order No. QUAD..... $15.95**

The Packet Radio Operator's Manual



This book is written by CQ columnist and Amateur Radio Packet authority Buck Rogers, K4ABT. An all new introduction and guide to packet operation, it is the perfect single source, whether you're an advanced user or just starting out. Learn about packet radio without all the technical jargon. Also included are detailed hookups for dozens of radio/packet controller/computer combinations, making this book the definitive resource for the active packet user. **Order No. PROM..... $15.95**

Ham Radio Horizons: The Book

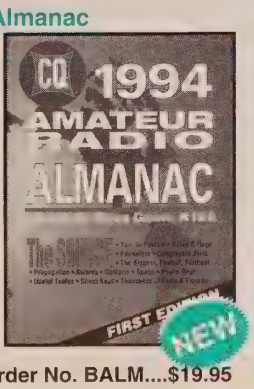


Written by Peter O'Dell, WB2D, this is a book about ham radio that every beginner can enjoy! If you want to get in on the fun and excitement of Amateur Radio, Ham Radio Horizons is the perfect way to get started. HRH is full of tips from expert hams in: DXing, Contesting, Serving the Public, Ham Radio in Space, Experimenting, Digital Communications — you name it! This exciting book is an excellent gift to a prospective ham or for use in your club's licensing classes and library. **Order No. BHOR..... $12.95**

The Vertical Antenna Handbook

Take advantage of the 20 years of research and practical experience of naval communications engineer Capt. Paul H. Lee, USN(ret), N6PL. Learn the basic theory, design, and practice of the vertical antenna. Discover easy construction projects such as a four-band DX vertical or a broadband array for 80 meters. Ever wonder how to build a functional directive vertical system? Paul Lee can get you started today! **Order No. VAH..... $9.95**

1994 Amateur Radio Almanac



If you're like most hams, you'll be fascinated by the thousands of facts, tables, graphs, maps, and other information to be uncovered in the **CQ 1994 Amateur Radio Almanac.** CQ's Almanac puts it all right at your fingertips, providing a resource that you'll refer to over and over again. This is one book you can't be without! **Order No. BALM....$19.95**

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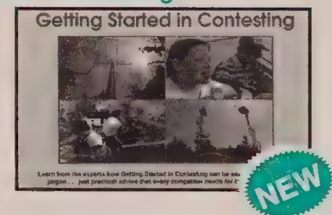

Whether you're a newcomer to contesting or an experienced veteran, CQ's **Getting Started in Contesting** is for you! You'll get advice and operating tips from some of contesting's most successful competitors, including Ken Wolff, K1EA, Dick Newell, AK1A, and CQ's own contest columnist, John Dorr, K1AR. Order our contest video and watch your scores begin to climb! **Order No. VCON....$19.95**

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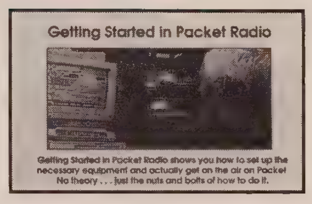

This video will help de-mystify the exciting but sometimes confusing world of packet radio. Learn how to get started using your computer on the radio. Included are step-by-step instructions on making packet contacts and using packet bulletin boards, networks and satellites. **Order No. VPAC.. $19.95**

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Getting Started in Ham Radio

This is a fast-paced video introduction to the fascinating world of ham radio. CQ's experts show how to select equipment and antennas; which bands to use; how to use repeater stations for improved VHF coverage; the importance of grounding and the basics of soldering. How to get the most out of your station, whether it's home-based, mobile or hand-held. **Order No. VHR $19.95**

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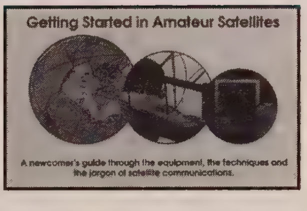

Learn with this video how veteran operators set up their satellite stations. Find out how to locate and track ham satellites with ease. Watch operators access current satellites and contact far ranging countries around the world. This video is filled with easy to understand advice and tips that can't be found anywhere else. **Order No. VSAT..... $19.95**

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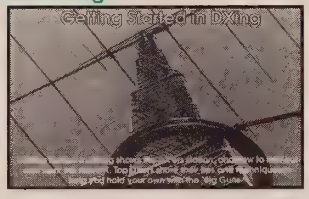

Top DXers share their experience with equipment, antennas, operating skills, and QSLing. You'll see hams work rare DX around the world. If you're new to DXing, this video is for you! All this valuable information may well give you the competitive edge you need to master the exciting world of DXing. **Order No. VDX..... $19.95**

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LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

The news from the shortwave front seems, more and more, a mix of good and bad—and lately you get the sense there's more bad than good coming at us.

The Voice of America has announced it will discontinue all broadcasts to Latin America after the World Cup soccer coverage ends. Apparently shortwave to Latin America will be replaced with broadcasts on local stations, fed via satellite.

The VOA has now shut down its old relay station at Tangier, Morocco in favor of the new site. The old Tangier site has been turned over for use by the Moroccan government so we may be seeing some new frequency usage by the government shortwave service before long.

Although not really a matter of cutting back, it's still a bit unnerving to learn that the BBC World Service is to be broken up into various geographical services sometime next year, with regional coverage for the Americas, Europe, Africa, the Arab World and South Asia—plus one for Russia, the Ukraine, Central Asia, and the Pacific.

China Radio International reports it's having difficulty keeping staff. Many are being lured away by higher salaries in China's private sector! Thus, some of the various language services are short on announcers and the future of those services is in some doubt; some may have to be dropped.

Looks like Gene Scott's Anguilla station won't be cancelled after all, despite the news we reported last time. Problems with the Anguillan government have apparently been worked out. The Anguilla station could be on the air sometime this summer. It's too soon, of course, to know anything as to frequencies and times. Bet we could make a pretty good guess as to what the programming will be, though!

Look for a new religious broadcaster to take the air from the African nation of Benin. SIM International, the same group which owns ELWA in Liberia, has applied for a broadcast license from the Benin government. The station would air programs in French and local languages. After what happened to ELWA during the Liberian civil war, SIM wants to hedge its bets and not center all of its African broadcasting effort at one location.

Another religious broadcast group, Adventist World Radio, is also giving some thought to putting a station on from Africa—perhaps Sao Tome or Namibia. Meantime, AWR was scheduled to have discontinued its broadcasts via Africa Number One in Gabon by now, since Africa is served by other AWR outlets, including those in Russia.

Italy's evening broadcast North America, which has run from 0100 to 0120 practically since Marconi was a kid, has been moved back to an 0050 start on 6095, 9725, and 11800. The reason is said to be to avoid co-channel interference.

Another new "station" on the air in Russia is Radio Republic of Sakha, which broadcasts from 0810 to 2000 on 7215. This is probably an all Russian language station.

Cambodia's government station has a new name. No longer the Voice of the People of Cambodia, it's now called the National Voice of Cambodia. That won't make it any easier to hear, however. This tough-to-hear broadcaster continues to use 11938, with English at 0000 and 1200.

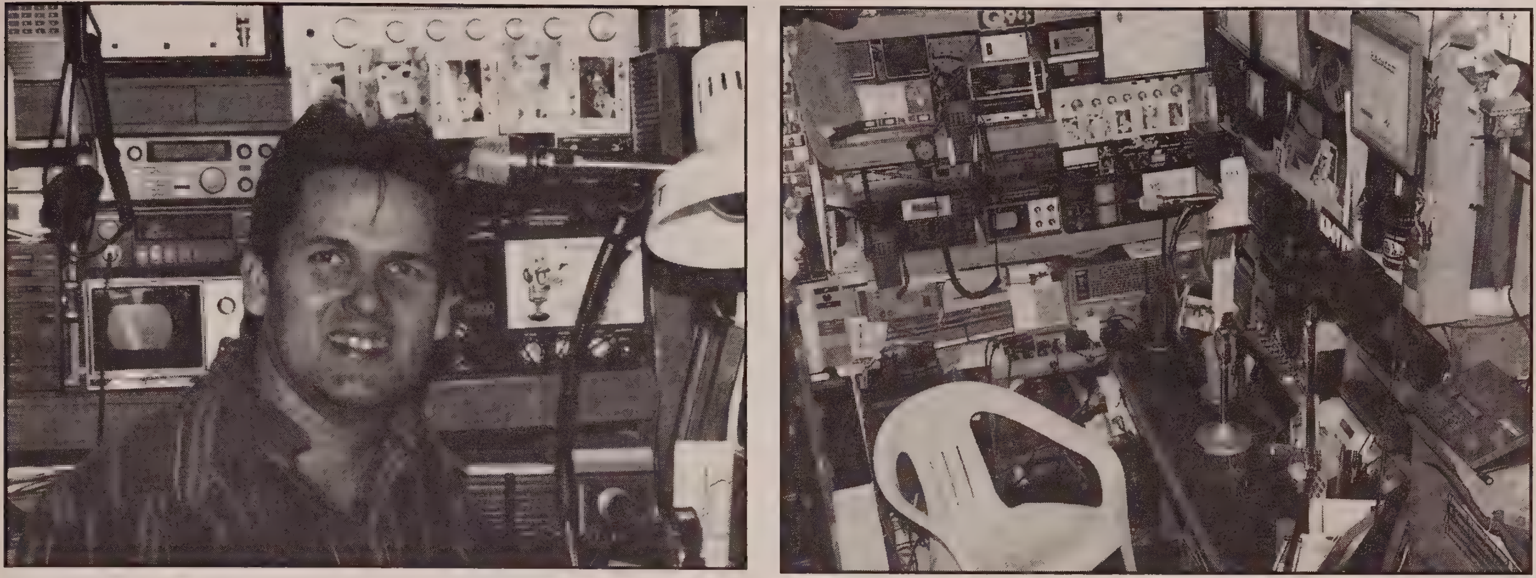
Uruguay, seldom mentioned by Listening Post reporters, may be getting a new

الجمهورية العربية السورية
SYRIAN ARAB REPUBLIC
المديرية العامة لهيئة الإذاعة والتلفزيون
SYRIAN RADIO & TELEVISION

Syrian Radio seems to have a broadcast intended for North America.

RDP
internacional
RÁDIO PORTUGAL

Here's a look at the Voice of America's Bethany transmitting plant.



Jeff Seymour of Colonia Heights, Virginia, isn't kidding when he says he has "a lot of VHF and UHF radios"—not to mention several shortwave sets.

station. Medium wave broadcaster CX48 wants to use 10 kW on 9650 from 1000 to 2100 and 5 kW on 15230 between 2100 and 2300.

HCJB is making some changes in its venerable DX Party Line show. Overall air time has been cut back. As some compensation they've added a 10 minute "updater" segment in the middle of the week. Look for it Thursday evenings in North America at 0400 on 9745. Other times include Wednesdays at 0700, 2130 to Europe and 0705 to the South Pacific.

Thanks and congrats to LeSea Broadcasting for offering us a dose of Hawaiian programming, now that its KWHR is on from the 50th state. "Sounds of Aloha" is aired from the Hilton Hawaiian Village Hotel, right on Waikiki Beach, on Sundays from (here's the rub) 0800 to 0830. The Hawaii outlet is on 9830, but it's also carried by WHRI on 7315 and 7355. You can write to the program producers at 1600 Kapiolani Blvd., Honolulu, HI 96804.

Notes in the Mail—Sue Widden in Columbus, Indiana wonders why so much of the broadcast interference she gets seems to be from preachers on various US frequencies. There's a lot of them, Sue! She also wonders if anyone produces a cassette

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CIRCLE 11 ON READER SERVICE CARD

Adam Lock, program director for religious shortwaver WWCR checks a dial reading.

of station identifiers. She says a tape of that kind would help identify some of the stations which don't broadcast in English. There used to be things like this available, Sue, but we don't know of anything currently available. Anyone? (Incidentally, we need your last name and state abbreviation on your reports.)

Charles Ames writes from Germany, and remarks on the changes in RIAS (mentioned in the March column). He notes that RIAS is now Deutschland Radio—Berlin, "as opposed to Deutchland Radio stations in other cities. Charles notes there was another RIAS station in Germany for a time after WWII—at Hof, near the former southern border with East Germany. In addition to listening, Charles has another interesting shortwave hobby—he collects old postwar German radios.

Let's hear from you one of these days! We welcome your log reports (which must both be double spaced and include your last name and state abbreviation after each item). Don't forget that photos of you and your shack, spare QSL carjds you don't need returned, station literature and schedules, clippings and so on are all warmly received. We use as much as we can!

Here are this month's loggings. All times are UTC. The broadcast language is assumed to be English (EE) unless noted otherwise (FF=French, SS=Spanish, AA=Arabic, etc.)

ANTIGUA—BBC relay, 5975 at 0313. (Vaage, CA) 17840 at 0509 with "Newshour." (Jeffery, NY)

Deutsche Welle relay on 15410 at 2327 in GG. (Foss, AK)

Abbreviations Used in Listening Post

AA	Arabic
BC	Broadcasting
CC	Chinese
EE	English
FF	French
GG	German
ID	Identification
IS	Interval Signal
JJ	Japanese
mx	Music
NA	North America
nx	News
OM	Male
pgm	Program
PP	Portuguese
RR	Russian
rx	Religion/ious
SA	South America/n
SS	Spanish
UTC	Coordinated Universal Time (ex-GMT)
v	Frequency varies
w/	With
WX	Weather
YL	Female
//	Parallel Frequencies

ASCENSION ISLAND—BBC relay, 17860 at 2019 and 17880 at 1440. (Jeffery, NY)

AUSTRALIA—Radio Australia, 9770 at 1103 and 15240 at 1331. (Jeffery, NY) 9685 at 0145. (Vaage, CA) 9860 at 1047. (Lamb, NY) 11660 (Carnarvon)// 11695 at 1545. (Urbelis, NY) 11720 (Brandon) at 0950 in Pidgin. (Flemmer, WA).

ABC Katherine, 2485 at 1016 with listener phone calls and pops. (Foss, AK)

Time station VNG, 16000 at 0430. Very weak. Tones but no voice audible. (Flemmer, WA)

BOLIVIA—Radio Abarora, Riberalta, 4712.6 at 1020 with Andes music, announcements, IDs, in SS. (Urbelis, NY)

BRAZIL—Super Radio Roraima, Boa Vista, 4875 at 0030 in PP with Brazil pops, commercials, IDs, time checks. (Urbelis, NY)

Radio Capixaba, Vitoria, 4935 at 0530 to 0740 in PP with a talk, IDs, very little music. (Urbelis, NY)

Radio Guaiba, 11785 at 0222 in PP with sports, IDs, news, Brazilian pops, address and off at 0400. (Lamb, NY)

Radio Nacional Sao Gabriel, Cacheira, 3375 at 0038 in PP with pops, IDs, mentions of the RadioBras network, talks. (Lamb, NY)

Radio Educacao Rural, 4755 at 0233 in PP with gaucho and Brazilian pops, echo talks, ID. (Lamb, NY)

Radiodifusoras Amazonas, Manaus, 4805 at 0054 in PP with pops, jingles, IDs, frequencies. (Lamb, NY)

Radio Pioneira, Teresina, Brazil, 5015 in PP at 0830-0940 with Brazil pops, commercials, announcements. (Urbelis, NY)

BULGARIA—Radio Bulgaria, 11645 at 2150 and new 17625 at 1253. (Rocker, NY)

Radio Moscow via Bulgaria, 7115 at 0331 with ID, "Russian by Radio." (Jeffery, NY)

Voice of America, via Plovdiv, new, 13680 with news. Off at 1900. (Lamb, NY)

CANADA—Radio Canada Int'l, 9755 at 2317, 15260 at 2221 and 21545 at 1352. (Jeffery, NY)

BBC via Sackville, 9515 at 1400 and 9590 at 2156 sign on, frequency info, program preview and into "Newshour." (Jeffery, NY)

Radio Japan via Sackville, 11705 at 1400 with language lesson, media show. (Jefferys, NY)

CHINA—Xinjang PBS, (Tibet, editor) 4735 at 1145 in CC with information and news. (Urbelis, NY)

CPBS, Beijing, 4905 at 2320 to 2345 fade, in CC. (Urbelis, NY)

China Radio Int'l, 5850 at 1151. Mongolian? (Foss, AK)

COLOMBIA—Ondas Orteguazas, Florencia, 4975 at 1045 in SS with Todelar Network programming, several IDs. (Urbelis, NY)

Radio Nacional, 11785 at 2357 with "Musica del Caribe" and "Musica Colombia" programs, IDs, "Colombia" jingle and anthem. Off at 0300. (Lamb, NY)

COSTA RICA—AWR 6150 via Cahuita site, 6150, and 11870, the latter now closed, at 0201 in SS with religious talks and music. (Lamb, NY) Use of 11870 has now been discontinued. Editor.

Radio Reloj, 6006 in SS at 1202 with Ave Maria, news, IDs, time checks, commercials, announcements. (Urbelis, NY)

Radio For Peace Int'l, on new 9400 at 0140. (Rocker, NY)

15030 at 1310 with UN programming. (Northrup, MO)

CROATIA—Croatian Radio, 5895 at 0140 in Croatian with local rock, ID, news, instrumentals. (Lamb, NY)

CUBA—Radio Havana Cuba, 9510 at 0530 with DX show. (Flemmer, WA) 15077 heard once at 2154 in EE with jazz, IS, ID, anthem and off at 2200. (Lamb, NY) 17835 at 0355. (Jeffery, NY)

CYPRUS—BBC relay, 6180 at 1745 with sports and news, mixing with Abu Dhabi. (Urbelis, NY) 11740 at 0320 in AA. (Flemmer, WA)

DOMINICAN REPUBLIC—R. Amanacer, 6025 at 1145 in SS with religious programming, IDs. (Urbelis, NY)

ECUADOR—Radio Bahai, 4950, Otavalo, 1100 with Andes music, announcements, time checks, IDs. (Urbelis, NY)

Radio Federacion, Sucua, 4961 in SS at 0100 to 0148 sign off. (Urbelis, NY)

EGYPT—Radio Cairo, 11600 at 0309 with music and news. (Jeffery, NY)

ENGLAND—Radio Canada Int'l via Skelton, 0006 on 17840. (Jeffery, NY)

BBC, 11900 at 0019. (Jeffery, NY)

FINLAND—Radio Finland on new 11900 at 1255. (Rocker, NY)

FRANCE—Radio France Int'l, 9745 with sign on in FF at 2154; ID, frequency info, news, music. 17845 at 0000 in FF. (Jeffery, NY) New 15530//17575 at 1210. (Rocker, NY)

GABON—Radio Japan relay, 21575 at 1401 with news. (Jeffery, NY)

GERMANY—Deutsche Welle on 11750 at 0305 with "German by Radio." (Rocker, NY)

Voice of America relay, 17835 at 0002 with news. (Jeffery, NY)

GHANA—Ghana Broadcasting Corporation, 3366 at 2342 in EE with US pops, choir, religious talk, drums, news, ID, time check. (Lamb, NY)

GUATEMALA—La Voz de Atitlan, Santiago, 2390 at 0300 in SS with ID, marimbas. (Urbelis, NY) AWR, 5980 at 1140 to 1300 in SS with religious programming, IDs, hymns. Poor modulation. (Urbelis, NY)

Radio Mam, Cabrican, 4825 in SS at 0045 to 0130 with religious programming, indian music. (Urbelis, NY)

HONDURAS—New station, Radio Internacional, 4930 in SS at 0337 with vocals, IDs, time checks, sound effects. Mentions of discoteca, buenos noches. Ballads after 0400. (Paszkiewicz, WI)

0456 with Latin ballads, IDs, sign-off announcement mentioning San Pedro Sula as location. IS and off at 0501. (Lamb, NY)

La Voz de Mosquitia, 4910.5 at 0133 in possible Miskito. Excited announcer, announcement, ID, hymn. (Paszkiewicz, WI)

Radio Luz y Vida, San Pedro Sula, 3250 at 0320 to 0355 sign off. English religious programs Saturday/Sunday only. Asks for reception reports. (Urbelis, NY)

HONG KONG—BBC relay, 7180 at 1330 to 1400. (Urbelis, NY) 11820 at 1417. Parallel 11750-Singapore. (Lamb, NY)

IRAN—VOIRI, 11790 at 1545 to 1630 in English and Farsi with music, commentary, revolutionary talks. (Urbelis, NY)

IRAQ—Iraqi Radio, 4620 at 2300 in AA. (Urbelis, NY)

ITALY—RAI domestic service, 6060 at 0321 in II with "Arrivederci Roma," II pops, IDs, news. (Lamb, NY)

JAPAN—Radio Japan, 11705 at 1430 with media program.

(Rocker, NY) 17835 at 0446 in JJ and 0512 in EE. (Jeffery, NY)

Radio Tanpa. 3925 in JJ at 1113. (Flemmer, WA)

JORDAN—Radio Jordan, 11940 at 0348 in AA. (Flemmer, WA)

KUWAIT—Radio Kuwait on new 11990 at 1830. (Rocker, NY)

LESOTHO—BBC relay, 11940 at 1745 with sports, "Newsdesk." (Urbelis, NY)

LIBYA—Radio Jamahiriyah, 15415 at 2316 with old rock, man in AA. (Foss, AK)

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Subject: Comparative Gain Testing of Citizen's Band Antennas
Ref: Rye Canyon Antenna Lab File #870529

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27.165	1.50	41
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27.365	2.00	58
27.405	2.00	58

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CIRCLE 84 ON READER SERVICE CARD

MALI—China Radio Int'l relay, 11715 at 0000 with news. (Jeffery, NY)

MOROCCO—VOA relay, 17895 at 1850 with "Africa World Tonight." (Jeffery, NY)

MOZAMBIQUE—Radio Mozambique, 3210 at 0315 to 0400 in PP with 60's US pops, ID, news at 0400. (Urbelis, NY)

NETHERLANDS—Radio Netherlands, 6015 at 0002. (Jeffery, NY) 15320 at 0131. (Vaage, CA)

NETHERLANDS ANTILLES—Radio Netherlands Bonaire relay, 9590 at 0332. (Jeffery, NY) 11660 at 1219 in SS. (Foss, AK) New 17655 at 1918. (Rocker, NY)

NIGERIA—Radio Nigeria, Enugu, 6025 at 2100 with news, local info and ID. Heavy QRM from 6020. (Urbelis, NY)

Radio Nigeria, Ibadan, 6050 at 2100 with news, information and ID. (Urbelis, NY)

NORTH KOREA—Korean Central Broadcasting Service, Pyongyang, 2850, at 1202 with man and woman talking in Korean. (Foss, AK)

Radio Pyongyang, 9977 at 1220. Music and woman talks. (Northrup, MO)

NORTHERN MARIANAS—KHBI, Saipan, 1300 on 13625 with Monitor Radio. (Urbelis, NY) 13840 at 0418. (Jeffery, NY)

OMAN—Radio Oman, 9735, AA at 1740. News at 1800 and mixing with VOA from that time. (Urbelis, NY)

BBC relay, 7160 at 1745 with sports, news. (Urbelis, NY)

PAKISTAN—Radio Pakistan, 13590//15675 at 1555 with sign on, IS, ID, "Typewriter Song," English news at regular and slow speeds. Off at 1630. Also 15675 at 1426 in Urdu with subcontinental music, IDs, "Typewriter Song," news, anthem and off at 1531. (Lamb, NY)

PAPUA NEW GUINEA—NBC, Port Moresby, 4890 at 0820 with island music and pops, local news, ID. (Flemmer, WA) (For some reason they've moved their 100 kW transmitter from the 31-meter band back here.—Ed.)

Radio Western, 3305 at 0919 with music, children singing gospel music. (Foss, AK)

PERU—Radio Santa Rosa, 6045.2 at 1018 in SS with speech, brass band, ID, vocals, time check, mentions of Lima. (Paszkiewicz, WI)

Radio Horizonte, 4505.2 at 0905 with SS talks, shouted ID, vocals. (Paszkiewicz, WI)

Radio Tropical, 4935 at 0350 in SS with vocals, time check, quick ID before lost to QRN. (Paszkiewicz, WI) 1015 with Andes music. (Urbelis, NY)

Radio del Pacifico, Lima, 4975 at 1100 in SS with ranchera music, many IDs, ads, time checks. (Urbelis, NY)

Radio Ancash, Huaraz, 4991 at 1030 in SS with news at 1100. (Urbelis, NY)

Radio Melodia, 5995.3 at 1010 in SS with commercial, time check during music, ID, mentions of Peru. (Paszkiewicz, WI)

Radio Maranon, Jaen, 4835 at 1005 in SS with announcements, IDs, Andes music. QRM from Tachira-4830. (Urbelis, NY)

Radio Cora, Lima, 4915 at 0315 in SS with political talk, ID, tangos. (Urbelis, NY)

Radio La Hora, Cusco, 4858.3 at 0950 in SS with vocals, "El Condor Pasa," time checks. (Paszkiewicz, WI)

Radio Quillabamba, 5025 at 1003 in SS with folk music, IDs, greetings to listeners. (Lamb, NY)

PORTUGAL—Radio Liberty, 11725 at 0307 in RR with news, ID, IS, "Amerikanski Humor" feature about US comedians. (Lamb, NY)

ROMANIA—Radio Romania Int'l, 9570 at 0400 sign on. (Rocker, NY)

Radio Moscow on 11750 at 2355. (Rocker, NY) 13705 at 0326 with "Science and Technology in the Commonwealth," "News in Brief" and "Learn Russian by Radio." (Jeffery, NY)

Magadan Radio, Yakutsk, 7320 at 0610 with man and woman in RR. (Foss, AK)

Radio Pamyat, 11650 in RR at 1315. No ID. (Northrup, MO)

Radio Netherlands via Irkutsk, 9860 at 1030. (Flemmer, WA)

RWANDA—Deutsche Welle relay, 11965 at 1530. (Urbelis, NY)

Radio Rwanda, 15340 at 1950 in FF with classical music, occasional talks and IDs. Off at 2051. (Lamb, NY) (It's even money both of these stations are off the air at present. Editor)

SAUDI ARABIA—BSKSA, 11965 at 1530 in AA with news and information. Mixed with Deutsche Welle. (Urbelis, NY) 15060 in AA at 0552 sign off, another time abruptly off at 0544. (Foss, AK)

SEYCHELLES—BBC relay, 15420 at 1745. Covered by WRNO at 1800. (Urbelis, NY)

SIERRA LEONE—SLBS on 3316 at 2150 with EE news at 2200. (Urbelis, NY)

SINGAPORE—Radio Singapore, 9530 at 1158 with country, oldies, ID, local time checks, history program, address. (Paszkiewicz, WI)

BBC relay, 9740 at 1745. (Urbelis, NY)

SLOVAK REPUBLIC—Slovak Radio, 5930 at 0100 with news, foreign exchange, business news, press review. (Paszkiewicz, WI)

SOUTH AFRICA—Channel Africa, 7185 at 0439 in FF with pops, sports, ID, news. Parallel 9520 after 0500. (Lamb, NY)

SPAIN—Spanish National Radio, 9530 at 2203 with news in SS. 9540 at 0021 in EE. (Jeffery, NY) 0149 with medical news and SS lesson. (Vaage, CA)

SWAZILAND—Trans World Radio, 3200 at 0305 in African language, religious programs. (Urbelis, NY)

SWEDEN—Radio Sweden, 9850 at 0230. (Rocker, NY)

SWITZERLAND—Swiss Radio Int'l, 9885 at 0325 with IS. (Northrup, MO)

SYRIA—Radio Damascus, 9950 at 1720 to 1800 sign off in AA. (Urbelis, NY) Damascus Radio (this is how they ID'd on the air) 12085//15095 at 2102 with Syrian music, news in EE, ID, anthem before 2105 sign off. Then back at 2107 with program for North America! (Lamb, NY)

TAHITI—Radio Tahiti, 11827//15169 at 0415 with island music and FF. (Flemmer, WA)

TAIWAN—Central Broadcasting System, 15125 at 0539 with man and woman in CC, CC pops. (Foss, AK)

TOGO—Radio Kara, 3220 at 0605 to 0715 in FF with news, local info, IDs, high-life music. Different program than 5047. (Urbelis, NY)

Radio Togo, 5047 at 2348 in FF with FF pops, IDs, frequencies, anthem and off at 0003. (Lamb, NY)

TURKEY—Voice of Turkey, 9445 at 2200 with anthem, sign on and news. (Jeffery, NY) Here and //11710 at 2210. (Rocker, NY)

9460//9685 in TT at 1705 to 2000. Also 1505 to 1630 on 15350. (Urbelis, NY)

UKRAINE—Radio Ukraine Int'l, 15180 at 0318 with listener letters, Ukrainian folk songs. (Foss, AK)

UNITED ARAB EMIRATES—Voice of the UAE, Abu Dhabi, 6180 at 1745 to 1830 in AA. Mixed with BBC. (Urbelis, NY)

UAE Radio, Dubai, 13675//15395//21605 at 1332 in EE with news, weather, address and program "The Holy Prophet." (Jeffery, NY)

UZBEK—Radio Tashkent, 6025//17745 at 1200 to 1228 close, EE news at 1200, music, commentary, "Life of Muslims." (Urbelis, NY)

VATICAN—Vatican Radio, 5882 at 2354 in II with relay of their domestic FM service. Easy listening music, ID in FF, EE, II and "Christus vincit" IS sung before off at 0033. (Lamb, NY) 6095 at 0300. (Rocker, NY)

VENEZUELA—Ecos del Torbes, 4980 at 0215 in SS with gum and candy commercials, ID, tangos. (Lamb, NY) 0315. (Flemmer, WA)

ZAMBIA—Zambia National Broadcasting Corporation, 4910 at 0305 in language, with news at 0400, hi-life music. (Urbelis, NY)

The following deserve a salute of thanks for a job well done:

Errol Urbelis, Kings Park, NY; Mark A. Northrup, Goldstone, MO; Marie Lamb, Brewerton, NY; Dave Jeffery, Niagra Falls, NY; Marty Foss, Wasilla, AK; Bjorn F. Vaage, Granada Hills, CA: Del Flemmer, Tacoma, WA; Ed Oswald, Sinking Springs, PA; Daryl Rocker, Herkimer, NY; and Sheryl Paszkiewicz, Manitowoc, WI.

Thanks to you all. And until next month, good listening! ■

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BY GERRY L. DEXTER

CLANDESTINE COMMUNIQUE

WHAT'S NEW WITH THE CLANDESTINES

The slaughter in Rwanda is in the news as this is written. One Rwandan clandestine on shortwave is Radio Muhabura, which operates on 6275, signing on at 0400. Unfortunately, it takes a pretty good receiver, above average conditions, and careful tuning to pull this one in. The station is operated by the Rwandan Patriotic Front, which is made up largely of members of the Tutsi ethnic group. "Muhabura" is the name of a mountain near Rwanda's northern border.

Stan Schmidt, of Indiana, reports that Radio Dnester International operates via Radio Moscow facilities at 2130 Mondays, Wednesdays, and Saturdays, on 9620, repeated the following day at the same time. The station broadcasts on behalf of the Russian separatists in the Moldavian republic of Predniestria. The English language broadcast announces an address of Radio Predniestria International, 25th October Street 45, Tiraspol, Predniestria. The broadcast ends at 2200, after which Radio Moscow programming resumes. We'd like to see a copy of a QSL from this one!

Non-clandestine Radio For Peace International is apparently quite irked by the several "right wing" political programs it finds on shortwave. So RFPI (coming from the left) has launched a regular program called the "Far Right Radio Review." RFPI is airing this on Fridays at 1830, and Saturdays at 2230.

Radio Freedom—The News Center of Free Iraq, which was thought to be inactive, is being noted again from 2200 sign on, on 11685, all Arabic. You'll have to contend with some co-channel QRM though. Another Iraqi clandestine—Radio Republic of Iraq—Voice of the Iraqi People is active on 9560, in Arabic around 1800. Voice of Rebellious Iraq operates variously on 5555, 5570, 5575, to sign off at 1830, all in Arabic.

One report says there's another Palestinian clandestine active on shortwave—Voice of the Palestinian Islamic Revolution operating on 7230 in Arabic at 1900 to 1930. It's hard to say what may happen to the various Palestinian voices if the Israeli-Palestinian accords take hold.

The Voice of Independent Kurdistan is operating on variable 7400 from 0700 to 0800, 0900 to 0940, and 1400 to 1600.

The National Radio of the Saharan Arab Democratic Republic has changed frequency and now operates from 1800 to 0100 in Arabic except for Spanish during the last hour; and 0600 to 0800 (Fridays to 0900) on a new frequency of 11800.

The Voice of the Mojahed is still active on several shortwave frequencies.

Colombian clandestine Radio Patria Libre is now operating on 6530 at 0030 to around 0110 closing, all in Spanish. The station also broadcasts from 1130 to 1210 on 6260, as well as on Saturdays from 1330 to 1410 on 15050, and Sundays 1500 to 1540 on 6660. It is using the slogan "La voz de la nueva Colombia" (the voice of new Colombia).

Voice of the Mojahed operates on widely variable frequencies around 5100, 5400, 5700, 6200, and 7000. Time segments include 1600 and 0100. The station always suffers from jamming.

We continue to see information indicating that Radio Free Bougainville is still (or again) operating. The latest frequency quoted in 3870 with a pending move down to 3840. Try for this one during the 0900 to 1100 period. One factor which may indicate the station really is active is the establishment of Radio United Bougainville (on 3880), which the government has put on the air ostensibly to combat Radio Free Bougainville. The station is operated by the National Broadcasting Commission and the Papua New Guinea military.

Voice of the Tigray Revolution, an Ethiopian clandestine, is now operating on 6770, with a sign on at 0338. It's likely the broadcast is all or mostly in the local Tigray (Tigre) language.

North Korea's Voice of National Salvation is now scheduled in Korean at 2000 to 0030, 0300 to 0700, and 1000 to 1700, and in English at 0030 to 0100 on 3480, 4400, 4450, 4557. Other frequencies are 4120, used at 1000 to 1700 and 6100 used at 1000 to 1400.

Let's have your letters and information! We'll be happy to receive and use notes on your clandestine station loggings. Also welcome are copies of QSLs from clandestine stations, station and organization literature and background information, addresses, and so on. If it is tied to the world of clandestine/political broadcasting, it is of interest to this column! We hope to hear from you often!

Until next month—good hunting!

WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

Roanoke Phantom Controller Sentenced

An unlicensed Roanoke, VA, radio operator who identified himself as the "Roanoke Phantom" and transmitted false air traffic control instructions and other information to aircraft pilots, was sentenced by U.S. District Judge Sam Wilson in federal district court in Roanoke.

According to a joint announcement by the FCC's Field Operations Bureau Chief Richard M. Smith and United States Attorney Robert P. Crouch, Jr., Rodney E. Bocook was sentenced Tuesday, April 26, 1994, for his conviction on criminal charges that he knowingly and willfully communicated false information by radio which endangered the safety of aircraft in flight, and used obscene, indecent, or profane language in a radio transmission. Both are criminal actions under the title of the United States Code.

Bocook had operated on aviation frequencies from both his Roanoke residence and his car while driving in Roanoke. His transmissions included misinformation to pilots, false distress calls, and obscene and offensive language.

Smith said the joint effort mounted by the Federal Communications Commission, the Federal Aviation Administration, the Federal Bureau of Investigation, and the Allegheny County Sheriff's Department to locate the perpetrator was one of the most difficult cases to solve. FCC investigators from across the country were called in to assist in surveillance, radio direction-finding, and technical signal analysis work. The case involved more of the Commission's resources than any other case in FCC history. "This joint effort resulted in resolution of a serious threat to aviation safety," said Smith. "The conviction and now the sentencing should send a strong message that people who commit this sort of serious violation will be caught and punished."

The maximum penalty for conviction on all counts is 22 years imprisonment and a $500,000 fine. Judge Wilson sentenced Bocook to 100 months, a fine of $2,000, and three years supervised probation following prison.

FCC Declines Relaxation of Amateur Rules Concerning Permissible Communications

The Commission denied two petitions for reconsideration of its decision to relax restriction on the scope of permissible communications in amateur service.

The Commission amended its rules to allow licensees to use amateur service frequencies to facilitate events such as races and parades, to support educational activities, to provide personal communications such as making appointments and ordering food, to collect data for the National Weather Service, and to provide assistance voluntarily, even where there are other authorized radio services available.

David B. Popkin and Rolland D. Cummings filed petitions requesting further relaxation of the rules to permit the retransmission of time broadcasts and other information originated by United States Government stations, and to substitute the phrase "instructional activity" for the phrase "classroom instruction."

Denying reconsideration, the Commission said the petitioners had merely reiterated views already expressed in comments in the *Notice of Proposed Rulemaking.*

FCC Affirms Denial for Waiver Transmitter Power in the Amateur Service

The FCC affirmed the Chief Private Radio Bureau's denial of a request by Dale Gagnon for a waiver of the Commission's rules governing the transmitter power standards in the Amateur Service. Gagnon requested permission for his amateur station to transmit at power levels greater than the 1,500 watts authorized by the rules.

Gagnon requested the need for higher power in order to engage in long-distance communications. He also sought to avoid the cost of bringing his vintage transmitters into compliance.

Affirming the Bureau's decision, the Commission said that Gagnon had not submitted any compelling arguments why his station should be given preferential treatment over other amateur stations operated by licensees of the same license class. The Commission also said that there is no basis for permitting Gagnon's station to use greater power than other amateur stations, and to do otherwise would be unfair to other amateur station licensees who must comply with the power requirement.

Commission Amends Rules Concerning Message Forwarding in Amateur Service

The FCC relaxed the amateur service rules to enable contemporary message forwarding systems to operate at hundreds of characters per second while retaining safeguards to prevent misuse.

A message forwarding system is a group of amateur stations participating in a voluntary, cooperative, interactive arrangement where communications from the control operator of an originating station are transmitted to one or more destination station via forwarding stations, which may or may not be automatically controlled.

Currently, the control operator of each station is held individually accountable for each message retransmitted, resulting in unnecessary content review and delays. The American Relay League, Inc., stated that the obligation of the control operator of the first forwarding station should be the establishment of the identity of the station originating the message. Only when this is not done should these control operators be held accountable for improper message content. Also, there are currently no central supervisory authority in an *ad hoc* amateur service digital network, making these unsupervised systems easy targets for misuse by uncooperative operators and nonlicensees. Moreover, the Commission said that it could be difficult to establish after the fact that a particular VHF station originated a fleeting high speed digital transmission. For these reasons, the Commission said there must be an on-going oversight of the system and the control operators of the first forwarding stations are in the best position to provide such an oversight.

Therefore, the Commission will hold accountable only the licensees of the station originating a message and the license of the first station forwarding a message in a high speed message forwarding system. The licensee of the first forwarding station must either authenticate the identity of the station from which it accepts communications on behalf of the system, or accept accountability for the content of message.

The Commission also clarified that the station receiving communications directly from the originating station and introduces it into the message forwarding system is the first forwarding station.

The League and Colorado Council of Amateur Radio Clubs suggested that the Commission substitute the word "simultaneously" for "instantaneously" in the redefinition of a repeater. The Commission concurred and adopted this communication.

The Commission believes these changes will enable high speed message forwarding systems to operate as their designers intended, while retaining the minimum safeguards necessary to prevent misuse.

Changes in RF Marketing and Authorization of Rules Proposed

The Commission proposed amending the marketing regulations and equipment authorization procedures that apply to radio frequency (RF) devices. (RF devices are products that, in their operation, are capable of emitting radio frequency energy. Examples are radio receivers, computers, video cassette recorders and radio transmitters.)

The proposed rules are intended to remove certain inconsistencies in the existing rules and to consolidate several interpretations issued in letters. These inconsistencies have led to confusion for industry and may have discouraged or prevented use of some otherwise legitimate methods of marketing RF devices pending receipt of an authorization from the Commission.

The Commission's action is partially in response to a petition for rulemaking filed by the Consumer Electronics Group of the Electronics Industries Associations.

Currently, the rules prohibit the marketing and operation of an RF device unless it complies with all of the FCC standards and equipment. Exceptions to the marketing rules are already provided for industrial, scientific, and medical (ISM) devices and many digital devices.

The proposed changes would harmonize the marketing rules for all RF products, permitting manufacturers to: 1) advertise and display products; 2) take orders for non-consumer products, provided the prospective buyer is advised in writing that the equipment must comply with the rules before delivery; 3) operate the products for compliance testing; 4) operate the products for performance evaluation at the manufacturer's or, for non-consumer products at the user's site; 5) operate non-consumer products at a user's site for determination of customer acceptability; and 6) demonstrate the products at trade shows.

Operation under these conditions remain subject to existing requirements to obtain a station license. All products must be labeled with a disclaimer of noncompliance.

The Commission also proposed to provide that any parties that modify a product subsequent to its compliance with the Commission's authorization requirements become responsible for ensuring that the product continues to comply with the appropriate standards.

It also proposed to clarify several ambiguous sections of the equipment authorization rules.

Comments Sought on Further Regulatory Forbearance for Small CMRS Providers

The Commission asked for comments on whether and how to forbear further from applying certain common carrier regulations to specific types of commercial mobile radio service (CMRS) providers.

In the Second Report and Order in GEN Docket 93-252, the Commission classified all mobile radio services as either commercial mobile radio service (CMRS) or private mobile radio service (PMRS) and determined, pursuant to the Omnibus Budget Reconciliation Act of 1993 (Budget Act), to forbear from applying the most burdensome sections of Title II of the Communications Act to any service classified as CMRS. At that time, the Commission determined that it would not forbear regulation under the remaining sections of Title II with respect to CMRS providers. The Commission determined that this decision would not place an undue burden on any CMRS provider or class of providers. At that time, however, the Commission also announced that it would conduct a further rulemaking that would gather a more extensive record to ensure that the potential effect of the remaining sections of Title II on particular types of CMRS providers within each class of service was, nevertheless, in the public interest.

Forbearance is a decision by the Commission not to apply certain regulatory obligations in particular cases. The Budget Act allows the Commission to decide to forbear from application of certain sections of Title II in cases where 1) enforcement is not necessary to ensure just, reasonable and nondiscriminatory rates; 2) enforcement of the provision is not necessary to protect consumers; and 3) forbearance is consistent with the public interest. Pursuant to the statute, the Commission may not forbear from those sections of Title II requiring just and reasonable rates and nondiscriminatory practices and those associated with the complaint remedy.

The Commission's initial forbearance substantially reduced the potential burden

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of complying with new CMRS regulation. In this action, the Commission begins proceeding to ensure that this decision has its intended effect. The Commission seeks comment on how the three-part statutory test for forbearance applies to those provisions of Title II, many of which are consumer-oriented, that continue to apply to CMRS. In connection with the third prong of the statutory test—forbearance from application of a provision in the public interest—the Commission tentatively identified two factors that would guide its public interest determination. The first is whether there are differential costs of complying with the remaining common carrier provisions that would make further forbearance appropriate for particular types of providers, such as small entities. The second is whether the public interest benefits from application of particular provisions are less for certain types of providers.

In determining the types of CMRS providers that may be appropriate for further forbearance, the Commission focused on small business entities because, if the costs of compliance with the remaining provisions of Title II are fixed, the additional regulation could prove disproportionately burdensome to small business. It also asked whether further forbearance could increase market participation by small businesses, thereby increasing the over-all level of competition in the CMRS market.

Recognizing the public interest in maintaining opportunities for small businesses and the role that further forbearance might play in reducing the cost of doing business for them, the Commission focused on the size of the provider as the basis for examining when it might be appropriate to subject certain classes of CMRS providers to further forbearance. It asked for comments on how to measure the size of CMRS providers, advancing several options. These options include examining the net worth, average annual revenues, or average number of subscribers for particular providers; considering various operational characteristics, such as number of authorized channels, as indications of size for CMRS forbearance on a case-by-case basis, with particular CMRS providers petitioning for further forbearance based on a showing that they have satisfied the statutory test for forbearance.

Denied Cancellation or Reduction of Forfeiture

The FCC upheld an action by the Field Operations Bureau and denied Joseph Sawchuck, IV's request for cancellation or reduction of a forfeiture issued in the amount of $5,000 for serving as the sole radio officer aboard a vessel in violation of the Communications Act. The Act requires two radio officers on board unless the radio officer has recovered a Six Month Service Endorsement to his First-Class Radiotelegraph Operator's Certificate.

Sawchuck served as sole radio officer aboard the vessel *Patriot* without a required Six Month Service Endorsement. Seeking review of the Bureau's assessment, Sawchuck argued that the Bureau had failed to adequately consider and apply the proper standard and downward adjustment criteria set forth in the Commission's *Policy Statement, Standards for Assessing Forfeitures.*

Denying review, the Commission stated that Sawchuck had filed to show that the Bureau erred in its findings of fact, or misapplied the law and its policy to the facts. The Commission said that all relevant facts were considered by the Bureau in reaching its finding of liability for monetary forfeiture. Also, the Commission found that the Bureau applied the correct standard in determining Sawchuck's liability for forfeiture under the Commission's *Policy Statement*, and all facts and circumstances applicable to each of the criteria set out in the *Policy Statement*.

Notice of Receipt of Foreign AM Broadcast Station Notification

The Commission is in receipt of Canadian Change List No. 509.

Copies of this listing are available for purchase from the International Transcription Services, Inc., 1919 M Street, N.W., Washington D.C., 20036, telephone (202) 857-3800. A copy is available for inspection of the Commission's AM Broadcast Data Base from the Audio Services Division Contact Representative, in Room 239, 1919 M Street, N.W., Washington D.C., during business hours.

New FCC Form 316 Available

The FCC Form 316 (Application for Consent to Assignment of Broadcast Station Construction to Permit, License or Transfer of Control of Corporation Holding Broadcast Station Construction Permit or License) has been revised. All changes to the FCC 316 were approved by the Office of Management and Budget.

The revised forms have been printed and are available for use (March 1994). Since many applicants may be far along in completing the old forms, the use of the revised FCC Form 316 will eliminate the need to file a separate FCC 155, Fee Processing Form, as that form has been incorporated into the new edition of the FCC 316. Applications must now be filed only on the revised FCC Form 316 (March '94 edition).

Application forms may be obtained either by writing to the Commission's Form Distribution Center, 2803 52nd Avenue, Hyattsville, MD 20781, or by calling (202) 632-FORM. Leave your request on the answering machine provided.

Modification of Mobile Service Rules Proposed

The Commission adopted a *Further Notice of Proposed Rulemaking* in this docket to continue the implementation of Sections 3(n) and 332 of the Communications Act (the Act), as amended by Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993.

In the *Second Report and Order* in this docket, adopted on February 3, 1994, the Commission applied the statutory definitions of "commercial mobile" radio service (CMRS) and "private mobile" radio service (PMRS) to determine the regulatory classification of all existing mobile services and of Personal Communications Services (PCS). In this *Further Notice*, the Commission proposed to complete the transition to the new regulatory regime envisioned by Congress. The Commission will act on these proposals by the August 10, 1994 deadline established by Congress for adoption of the rules implementing the statute.

The *Further Notice* addresses the impact of the statue on technical, operational, and licensing rules for the mobile services, and particularly on the rules affecting former private land mobile services that have been reclassified as CMRS. As required by the Budget Act, the Commission proposed to amend these rules to ensure that competitors in the mobile services marketplace are subject to comparable regulatory requirements and that inconsistencies in the regulation of substantially similar services are eliminated.

First, the Budget Act requires that rules governing the former private land mobile radio services that are reclassified as CMRS be amended "as may be necessary and practical to assure hat licensees in such service are subjected to technical requirements that are comparable to the technical requirements that apply to licensees that are providers of substantially similar common carrier services." The Commission proposed to define "substantially similar" services for this purpose as those services that compete with one another to provide similar service to the end user. It tentatively concluded that 1) "wide-area" specialized mobile radio (SMR) services are substantially similar to cellular telephone service, and 2) private carrier paging services are substantially similar to common carrier paging services. The Commission also asked for comment on whether commercial 220-222 MHz services or narrowband PCS; whether traditional SMR service is similar to any Public Land Mobile Service; and whether Business Radio licensees reclassified as CMRS are similar to any existing Part 22 services.

Second, the Commission asked for comments on what changes should be made to existing technical and operational rules in Part 90 and Part 22 to ensure that substantially similar services are regulated in a comparable manner. The Commission emphasized that the statute does not compel the rigid application of uniform rules, but instead requires only such changes as are "necessary and practical" to achieve "comparable rules." The Commission stated that in determining whether the existing rules should be eliminated, modified, or retained, it would place particular emphasis on the effect that each of these options would have on competition and on the cost likely to be incurred by substantially similar mobile service providers.

Applying this analysis to technical rules, the Commission reviewed rules in both Part 90 and Part 22 relating to channel assignment, service area definitions, co-channel and adjacent-channel interference protection, height/power limitations, and interoperability standards for equipment. Specifically, the *Further Notice* asks if the Commission's existing riles for 800 and 900 MHz SMR services should be revised to facilitate licensing on a wide-area, multichannel basis comparable to the licensing on schemes for cellular and broadband PCS (i.e., the assignment of multiple channels within Commission-defined service areas). The *Further Notice* also seeks comment on other technical issues, including 1) whether to conform technical rules for 900 MHz paging systems; 2) possible regional assignment of 220-222 MHz channels; 3) whether Part 22 and Part 90 rules relating to co-cellular-type interoperability standards to other, similar mobile services. In each instance, the *Further Notice* seeks comment on whether implementing comparable regulation for similar services requires the conforming of existing rules, and if so, how the rules should be conformed.

The Commission also reviewed operational rules for similar Part 90 and Part 22 services and proposed changes to ensure consistent regulatory treatment. These rules regulate matters such as time to construct, channel loading and area coverage requirements, permissible services, user eligibility, general licensee responsibility and system operation, and equal opportunity in employment. The Commission sought comment on a variety of possible rule modifications, including 1) a "baseline" construction period of 12 months for all CMRS systems not requiring an extended period for station construction; 2) extended construction periods for wide-area CMRS providers; 3) use of construction and service area coverage requirements in lieu of loading requirements to ensure efficient spectrum use by CMRS licensees; 4) elimination of user eligibility restrictions for Part 90 CMRS licensees; 5) simplification and conforming of Part 90 and Part 22 station identification procedures; and 6) requiring Part 90 CMRS licensees to comply with Commission EEO obligations that currently apply to Part 22 licensees.

Lastly, the Commission proposed new licensing procedures for CMRS applicants in these Part 90 services that were formerly licensed solely on a private basis. Because Section 332 requires CMRS providers to be "treated as common carriers for purposes of [the] Act," all CMRS applications must comply with 1) common carrier licensing procedures, including the Act's public notice requirement in Section 309(b) and 2) common carrier eligibility restrictions, including the prohibition on alien ownership in Sections 310(a) and (b) of the Act.

To implement these statutory requirements, the Commission proposed to adopt the same application and licensing rules for Part 90 CMRS applicants that currently apply to Part 22 applicants. Thus, all Part 90 CMRS applications would be placed on 30 days public notice and would be subject to petitions to deny, and applicants would be required to provide the same qualifying information as Part 22 applicants. The Commission also sought comment on the possibility of developing a unitary form for mobile service applicants, while proposing interim procedures whereby applicants would continue to use existing forms until the transition to a revised form can be accomplished.

The Commission also sought comment on other proposals to confirm existing licensing rules for CMRS providers, including 1) conforming Part 90 and Part 22 procedures for determining when applications are mutually exclusive; 2) adopting uniform licenses; 3) implementing a uniform 10-

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year license term for all CMRS licensees; 4) adopting uniform rules regarding requests to transfer and assign CMRS licenses; 5) revising Part 90 rules relating to operation under special temporary authority. The Commission also proposed rules that would allow Part 90 CMRS licensees to combine CMRS and PMRS offerings under a single license on the same basis as PCS licensees.

The Commission stated that the licensing rules proposed in the *Further Notice* would become effective upon the conclusion of this rulemaking, except that they would not apply until August 10, 1996 to private paging licensees or to licensees in any other Part 90 service who have been "grandfathered" in that service under the three-year transition period established by the Budget Act.

Further Comments Sought on Proposal to Route Calls Via the Carrier Chosen by the Part Paying for the Call

The Commission announced that it seeks further comment on whether to mandate a new system for routing "0+" calls which are made by entering a zero followed by a long distance number. While it found that the evidence available to it indicated that the benefits of a new system, called Billed Party Preference to BPP, outweighed its costs, the Commission also found that some of the data underlying its costs/benefits analysis were not as firm or as current as desired.

Currently, 0+ calls are sent to the operator services provider (OSP) to which the premises owner or payphone provider presubscribes. Under BPP, calls would be routed automatically to the OSP preferred by the party being billed for the call. For example, a calling card would be routed to the cardholder's preferred OSP. A collect call would be routed to the called party's OSP. A call billed to a third party would be routed to the OSP to which that third party had presubscribed.

The Commission found that BPP would provide three principal benefits. First, it would make operator services more "user friendly." Under a BPP system, callers would be able to make all of their operator-assisted calls on a 0+ basis, and they would be able to do so with the knowledge that calls would automatically handled by the OSP with which the billed party had to be chosen to do business at the rates offered by that OSP.

Callers who currently use access codes would no longer need to do so. Callers who do not use access codes would no longer face the risk that their call would be carried by an operator service provider with rates considerably higher than the industry average. Based on the data in the Commission's November 1992 report issued pursuant to the Telephone Operator Consumer Services Information Act, the Commission estimated that BPP would likely enable consumers to save about $280 million a year by avoiding operator service providers with rates higher than the AT&T/MCI/Sprint average.

Second, the Commission found that BPP would force OSPs to refocus their competitive efforts towards serving consumers rather serving aggregators, such as premises owners or payphone providers. The Commission recognized that a shift in competitive focus would almost certainly eliminate commissions that OSPs now pay to aggregators for directing 0+ calls to them. Moreover, based on the available data, it is estimated that the elimination of commissions could save operator service providers about $340 million per year on interLATA 0+ calls. The Commission found that this could offset a substantial portion of the costs of BPP, and that a shift in competitive focus could also foster lower prices and better service for consumers.

Finally, the Commission noted that BPP would eliminate certain AT&T advantages in the operator services market. For example, it would enable AT&T's competitors to offer end users the same 0+ access as AT&T.

On the other hand, the Commission also noted that BPP is an expensive technology. While it found that available data indicated that the net cost of BPP for LECs would be approximately $380 million on an amortized unseparated cost basis, with an additional estimated $35 million per year for OSP expenses, it observed that this estimate was based on data that was not as firm nor as current as it would have liked.

Therefore, the Commission chose to issue a *Further Notice* that sets forth in detail its cost/benefit analysis based on the available data, giving parties the opportunity to comment on the analysis and to submit additional, updated data to corroborate or refute it. The Commission also seeks comment on whether some or all of the benefits of BPP could be achieved through alternative, less costly measures.

Finally, the Commission also addressed some aspects of how BPP should be implemented in the event it decides to mandate it. For example, the Commission decided that, if mandated, BPP should apply on a nationwide basis to all 0+ and 0- interLATA calls and that it should accommodate commercial credit cards. It also concluded that BPP should not give either LECs or OSPs the exclusive ability to issue line number cards, however, it seeks further comment on whether BPP should increase a 14 or 10 digit screening design. It also seeks comment on whether prison phones should be subject to BPP. ■

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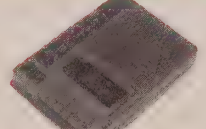

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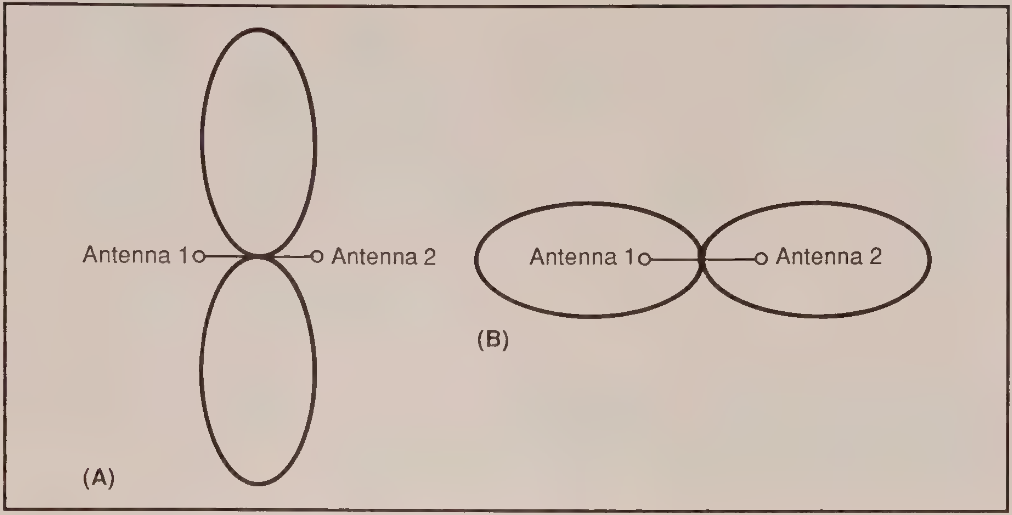


Figure 1. Direction patterns for two verticals half wavelength apart: A) antennas in-phase (0°).B) antennas out-of-phase (180°).

Okay, so you saw it in a book and you like the idea of a phased array of vertical antennas. They're neat! These arrays consist of a pair of verticals spaced X wavelength apart (usually half wavelength), and they can produce a wonderful figure-eight pattern, and show gain over a dipole. Figure 1 shows how a pair of verticals spaced a half wavelength apart react when fed in-phase and 180 degrees out-of-phase with each other. In Figure 1A, the antennas are fed in-phase, so the two main lobes are found at right angles to the line between the two antennas. If the antennas are fed 180 degrees out of phase, on the other hand, as in Figure 1B, then the pattern flips 90 degrees and is found along the line of centers between the two antennas. If you have a means of switching between 0 and 180 degree phasing, you not only get the gain, but also the ability to control the direction of the main lobes and nulls.

Swell, so you rush out to the Harry and Harriet Homeowner store, fetch a big pile of aluminum tubing, and go to work. When nearly completed, as you connect the coaxial cable between the two antennas, you find that the book lied to you: it's not possible to finish the job. Why?

Well, let's consider the case where two verticals are spaced half wavelength apart. The antennas are spaced a physical half wavelength apart (492/FMHz), but the coax must be an electrical half wavelength (492V/FMHz). The difference between the two lengths is the velocity factor (V) of the coaxial cable, which tends to be on the order of 0.66 or 0.80 depending on the type of cable used. Thus, the cable will always be too short to reach between the antennas. That's the critical fact missing in stories about the phased array

Over the years there have been several ways to solve this problem. One method uses two different coaxial lines to the antennas from the receiver. If one is a quarter wavelength and the other is three-quarter wavelength, then the required phase shift is obtained by the extra coaxial line length. But, extra coax causes increased loss, so the signal is not only not as strong as predicted, but the patterns are distorted somewhat. Sigh, what's a body to do.

Well, there is one little trick that's possible; see Figure 2. Here are two vertical antennas spaced S apart (for most people, I suspect S will be half wavelength, or 492/FMHz). A pair of identical length (L1 and L2) pieces of identical coaxial cable are used to connect the two verticals to a phasing box. Note that it's not important just how long those cable are, but that they be precisely the same length as each other. The phasing box is, in turn, connected through a third length of coax (actual length unimportant) that goes to the receiver.

If the phasing box is made switchable, then both in-phase and out-of-phase conditions can be satisfied. Figure 3 shows a sample phasing box that I've used. The innards consist of a transformer in which three windings are wound "trifilar" style on a toroidal core. Almost any HF band toroid can be used, but I used the Amidon Associates [2216 East Gladwick, Dominguez Hills, CA, 90220; 310-763-5770 (voice) or 310-763-2250 (fax)] type T-50-2 (RED) or type T-50-6 (YEL) cores for this type of project. Use 15 trifilar turns of #26 enamel insulated wire around the toroidal core. A DPDT toggle switch is used to select either zero or 180 degree phasing for one antenna input (the other input remains constant).

So what's a "trifilar turn?" Good ques-

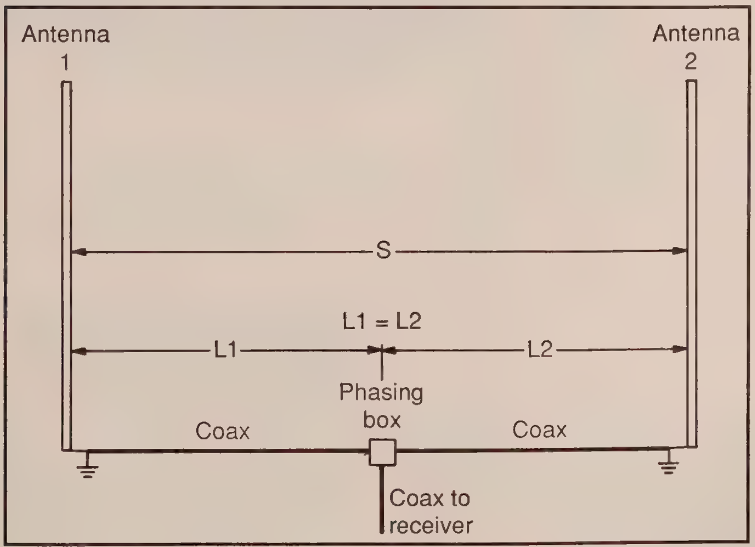
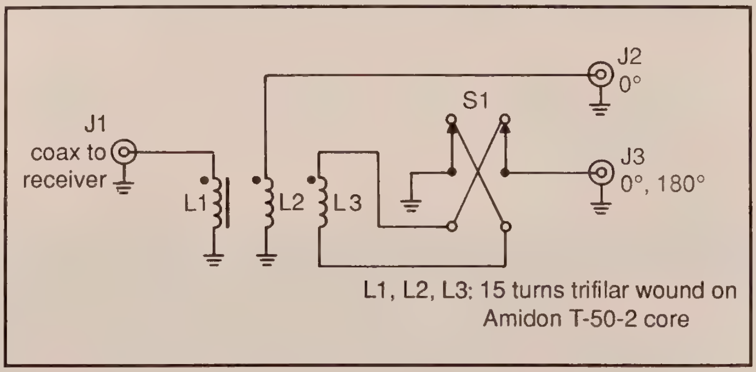


Figure 2. Configuration of antennas using phasing box.

Figure 3. Circuit of phasing box.



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tion. See Figure 4 for the answer. In trifilar winding, three wires are kept parallel to each other as they are wound on the toroidal core.

Figure 5A shows the completed project. It is built in a small aluminium chassis box (Hammond, Bud or LMB) with a switch to select phasing. Construction (Figure 5B) is a bit crude, but it worked well.

An improvement in the transformer can be made by using a special transformer known as a hybrid combiner transformer. Perhaps in the future we will examine that subject as well.

If you want to be real neat about it, then I recommend that you use one of the Mini-Circuits [P.O. Box 350166, Brooklyn, NY, 11235-0003; 718-934-4500 (voice) or 718-332-4661 (fax)] pre-made RF transformers. You need to buy a 1:1:1 model in the frequency range that suits you. The table below shows those listed in the Mini-Circuits catalog:

Type No.	Freq. Range (MHz)
T-622	0.1 to 200
T-626	0.01 to 10

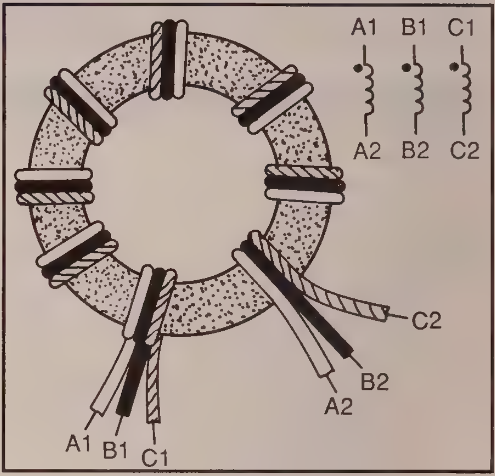

Figure 4. Trifilar winding scheme for toroids.

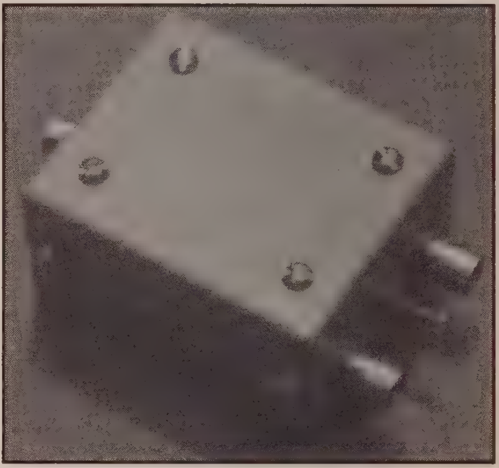

Figure 5a. The completed phasing box.

Figure 5b. A look inside (ugh!)

These transformers are listed at less than $4 in unit quantities in the latest Mini-Circuits catalog. They come in a small metal package that can plug into the same space as a dual inline package (DIP) integrated circuit. As a result of that little fact one can use perforated board to hold the transformer. Radio Shack stores sell small bits of perforated board, as well as "hobby printed circuit boards" that have either DIP patterns or merely copper pads around holes (several patterns available, and all are suited to this use). The smaller boards come in two sections of about 1.5 inches square joined together. You can snap them apart and use either half for the transformer, leaving the other half for another project...or to allow your buddy to build a transformer phasing box too. ■

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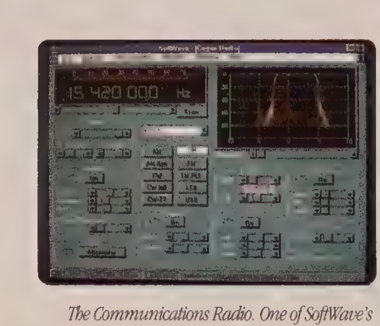

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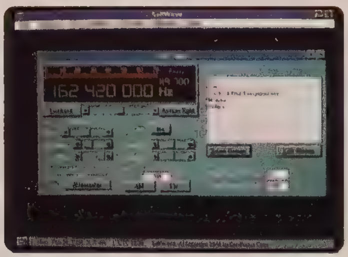

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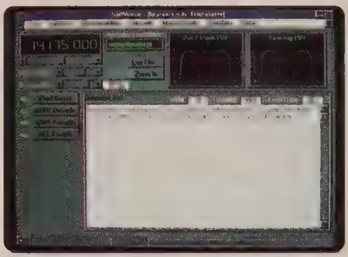

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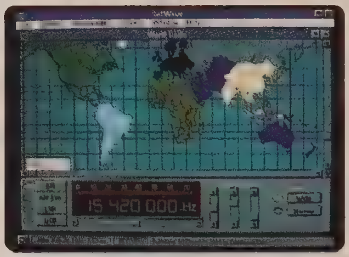

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TELEPHONES ENROUTE

BY TOM KNEITEL, K2AES

WHAT'S HAPPENING WITH CELLULAR, MARINE & MOBILE PHONES

In Vanderburgh County, Ind., a scanner owner was mentioned in local news media as having intercepted a mobile telephone conversation in which plans for an office burglary were worked out. The unidentified scanner citizen hailed a passing sheriff's vehicle so the deputy could also hear the conversation.

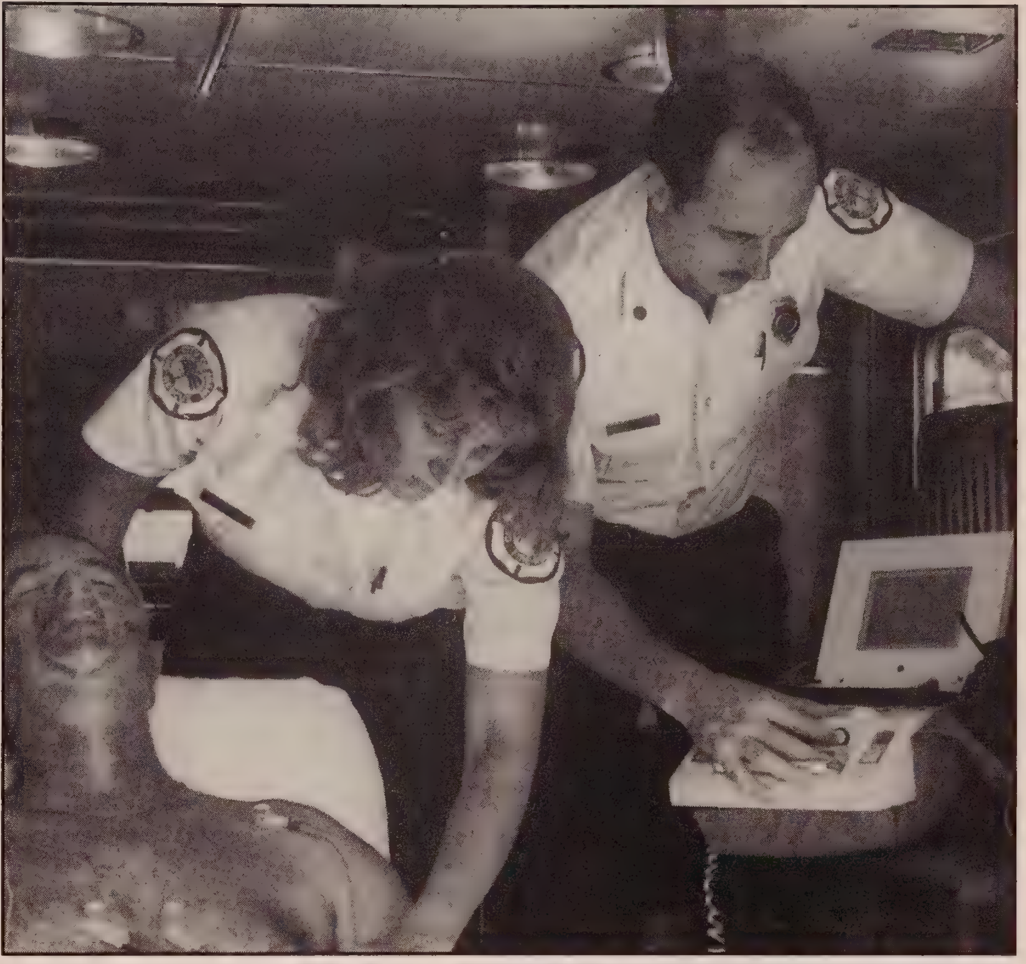
The police officer later confirmed that the conversation was between two persons plotting a burglary of an office supply company in the area of the Evansville Regional Airport. Their stated intention was to steal blank money orders.

Although the company was not named during the conversation, detectives were able to guess its identity based upon the general vicinity mentioned and other information discussed. The company was contacted and agreed to allow detectives to put the premises under surveillance.

Late that night, a would-be intruder began a forced entry through a drive-up window. Unsuccessful, he left. Backup police and sheriff's personnel were notified and stopped the man's truck a few minutes later. He was arrested and charged with attempted burglary.

Yet one more instance where a good citizen with a scanner, illegally tuned to off-limits frequencies, served his community well. Has anybody ever figured out who the so-called "privacy" laws are supposed to protect—the good guys or the bad guys? Congress automatically passes all of these laws after being heavily lobbied by the cellphone industry.

The information on the scanner owner's good deed was supplied by Richard F. Lythgoe, Evansville, Ind.



City of Miami paramedics hook up a portable medical telemetry unit that transmits over cellular frequencies.

Turning the Tables

Why not turn the tables and use cellphones to help fight crime? Not a bad idea, and 70 percent of those responding to a recent survey admitted that safety and security are the best reasons to own a cellphone. Of that group, more than half reported having used their cellular to report crimes, drunken drivers, car trouble, accidents, or medical emergencies.

US WEST Cellular, for one, has established a number of public safety cellphone interfaces in the 13 states where the company operates. These promote safety and seek to fight crime. A sampling of these includes:

1. Working with the Utah County Sheriff's Dept., the company established a special hotline—"COP"—for cellphone users to call if they spot suspected gang activity.
2. Working with the Police Dept. in Redmond, Wash., teens can directly contact police officers via "Dial-A-Cop" service.
3. Crime watch lines have been established in Casper, Wyo., Albuquerque, N.M., and Spokane, Wash. These lines have been coordinated with local law enforcement or the CrimeStoppers organization.
4. In San Diego, cellulars have been donated to "Safe Rides" coordinators who arrange transportation for area teens who may find themselves in a dangerous situation on a weekend night.
5. Special dial-up plans have been established for reporting suspected drunk drivers on Colorado, New Mexico, Iowa, and Wyoming highways.

On the East Coast, Bell Atlantic Mobile Systems, donated cellphones to a 60-member neighborhood patrol group in the Hunting Ridge section of West Baltimore, Md. Plagued by armed robberies, break-ins, car thefts, and a murder, neighborhood residents formed a volunteer patrol. Members drive the streets nightly to spot and report suspicious activity or crimes to the attention of local police.

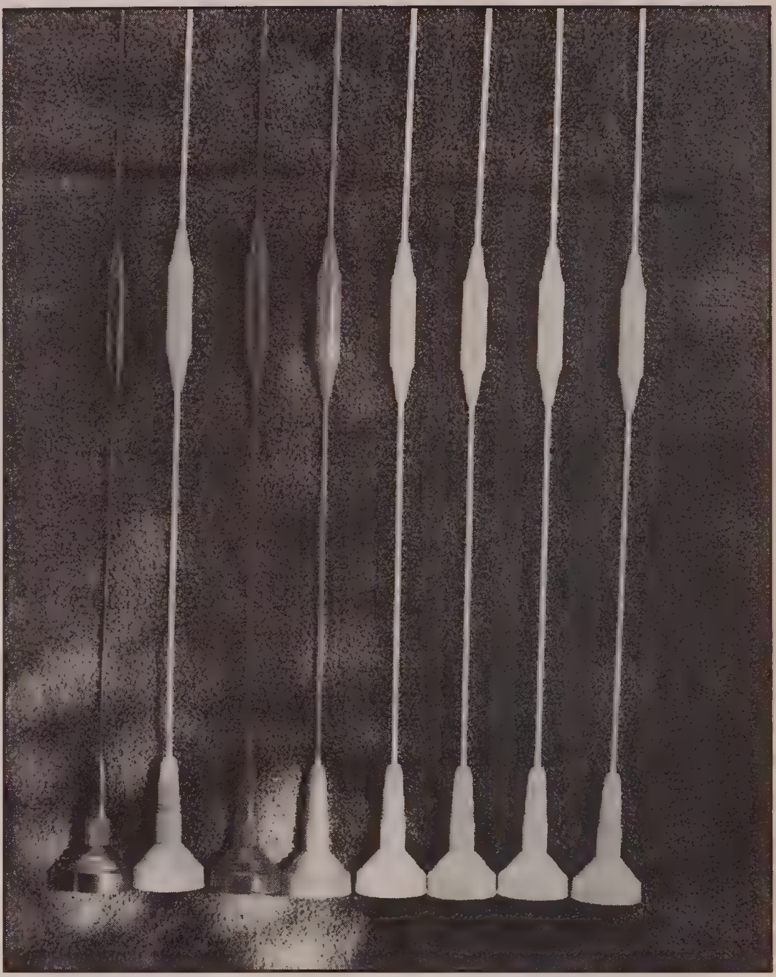
Any cellphone user, anywhere, can use their cellular to report suspected criminal activity. Follow these tips:

1. Report emergencies to 9-1-1, or other emergency numbers. Enter the number in your automatic dialer.
2. State the nature of the incident, but be brief.
3. State that you are on a cellular, and give your cellphone number.
4. Give the exact location of the incident you are reporting.
5. Speak slowly and distinctly. Listen to the dispatcher, and answer any questions.
6. Don't hang up. Attempt to stay on the line and continue to report what's happening unless you are told to do otherwise.
7. Never attempt to stop the criminal yourself. Await the arrival of police unless your own safety appears threatened.

This idea really works! It helped last year in Florida when Metro-Dade commissioner Arthur Teele dialed up 9-1-1 on his cellphone and reported an armed robbery of a Venezuelan family visiting Miami. As a direct result, the family was rescued from their assailants, and the robbery suspects were quickly arrested.

As a result of his good deed, Teele received the 1993 Cellular Samaritan Award, sponsored annually by the Citizens' Crime Watch of Dade County, and Cellular One of Florida. Good work!

The Sima PowerMax-200 can be used for recharging a cellular, and also a camcorder, as well as a notebook portable computer.



These are some of Antler's mobile cellular antennas, actually available in 10 attractive colors. Not that you'd know it from our black/white photo.

More Good Work!

The City of Miami (Fla.) Fire Dept. recently completed installation of portable medical cellular telemetry units in all of its rescue vehicles. They measure and transmit EKG data via cellular radio to UM/ Jackson Memorial Hospital and Mercy Hospital. There, doctors assess the patient's condition before the rescue team reaches the emergency room. This saves valuable time when every minute may be vital to the patient's survival.

The data transmissions are easily handled through the Cellular One facilities, and passed without flaw to the costly ($5,000 to $10,000 each) receiving units installed at the hospitals. Equipment now being installed in rescue vehicles will send 12-lead telemetry via cellular to standard fax machines at a hospital, clinic, or doctor's office.

Cellular Accessory

The PowerMax-200 is a quick-charging system for cellphones that can also be used for camcorder and notebook computer batteries. The device has a universal charging/ discharging base, as well as a family of individual PowerTrays for each model battery. The system is compatible with all Nickel Cadmium, Nickel Metal Hydride, or Prismatic batteries.

The PowerMax-200 PowerTrays are sold separately, so the user can purchase the universal base and those particular trays needed. As needs change, other trays may be purchased.

An advanced micro-processor automatically determines the battery type, voltage and capacity. Then it safely discharges and charges it in the fastest possible time. With a 1200 mA constant current change in the DC mode, charge time is about twice as fast. Users can monitor the operating cycle via the five-level display. A beeper sounds when the charge is completed.

The MSRP of the universal base is $124.95, with all PowerTrays tagged at $19.95 each. For more information, contact Sima Products Corp., 6153 Mulford St., Niles, IL 60714. Phone: (708) 966-0300.

How's your Imagination?

Why are all mobile cellular antennas flat black? They aren't any longer! Now you can get cellphone antennas in 10 standard colors, allowing you to customize your installation. Pick one in the same color as your vehicle, or a contrasting color.

Furthermore, Antler Systems, Inc., which makes all these flavors, tells me that this wonderful array of colors isn't limited only to cellular frequencies. These mobile antennas are available in different models available for use on each of the land mobile frequency bands between 400 and 900 MHz.

Unless you have a great imagination, our black and white repro of their vivid color photo doesn't do full justice to the rainbow of hues. Take my word for it, there's a blue antenna, a red one, pink, pale green, tan, white, and like that, plus two more that didn't make it into the shot. These antennas are good looking. You could always make believe our photo is a trendy black/ white TV commercial.

For further information, contact Antler Systems, Dept. PR-7, P.O. Box 7096, St. Petersburg, FL 33734. Phone: (813) 522-2271.

Please Come Back!

This column seeks press releases, product news, reader comments, news clippings and other information relating to cellphones, cordless phones, PCS, air/ground phones, and other associated systems.

SCANNING VHF/UHF

BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

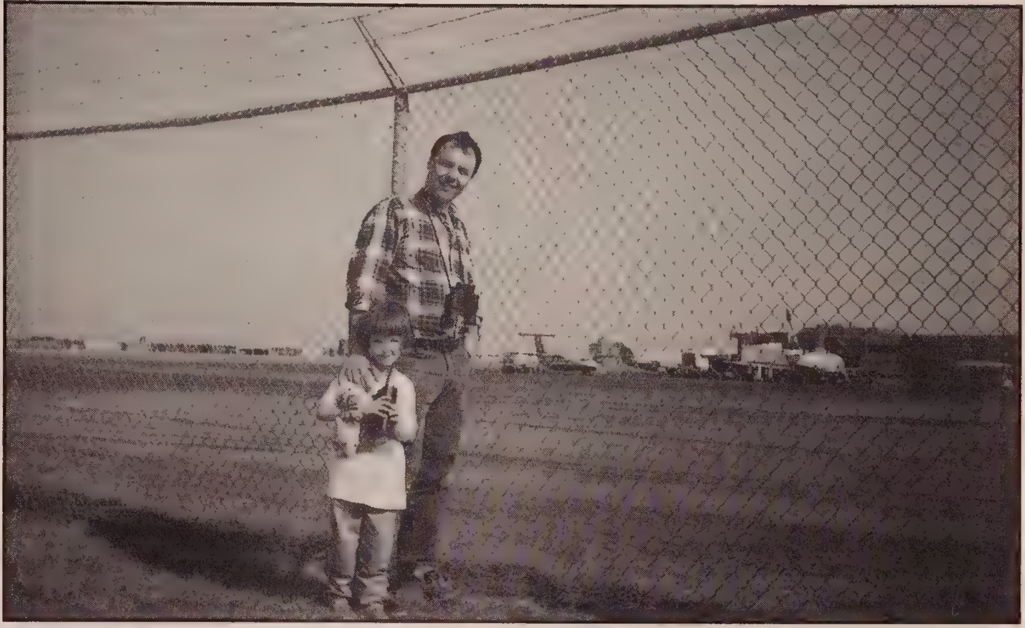
The Scanning VHF/UHF mailbag has been oveflowing lately. Without wasting any time, let's reach right in and check some letters.

First, we have a fax from Robin Verhose of Spring Lake Heights, New Jersey. She says one thing she likes to listen to on her Uniden Bearcat 200XLT handheld scanner is NJ Transit trains on 161.400, especially the Shark River bridge in Belmar, New Jersey. However, she hasn't heard anything there for months and is wondering what she's missing. She's quite puzzled by the disappearing act. I don't have the exact answer, but I'm willing to bet that the NJ Transit trains have moved to NJ Transit's 800 MHz trunked statewide radio system that the buses have been using for several years. NJ Transit buses have been using the system for quite some time so that buses can be in contact with their dispatchers anywhere in the state of New Jersey. There are a variety of frequencies used, so you may just want to search through the 800 MHz band and see if the trains pop up on any frequencies there.

Jerry Oglesbee, of Sour Lake, Texas, writes that he recently purchased a Trident 2400 handheld scanner from Ace Communications and is extremely pleased with the radio. He notes that the scanner has coverage from 100 kHz to slightly above 2 GHz, offers upper and lower sideband reception, and the scanner is similar to the AOR 1000XLT handheld. Jerry states that the ten scan banks have 100 channels each, for a total of 1,000 channels. The Trident 2400 also can search in increments as small as 1 kHz, which comes in handy on the shortwave bands. Jerry felt a radio that's as loaded as the Trident 2400 deserved praise.

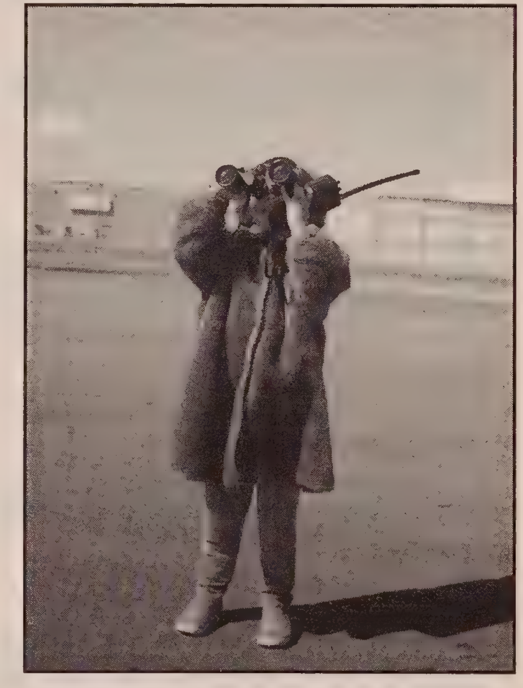
T.E. Randall, of Lake Worth, Florida, sent in some news clippings describing problems the state of Florida is having with Motorola in getting a statewide radio system on the air. Although there is no mention of frequencies, it probably is a trunked 800 MHz system. A trial $25 million system was put on line in Monroe, Dade, and Broward counties. The statewide estimate runs $196 million to $474 million, depending on options selected for the system, officials said. Agencies expected to use the system include the following Florida departments: Law Enforcement, Business and Professional Regulation, Environmental Protection and Management Services, Game and Fresh Water Fish Commission, and Florida Highway Patrol. Some of the problems being experienced include poor voice quality, and garbled or lost signals.

The Florida system has been in the planning stages for ten years. If completed, the system will link all police agencies in the state for the first time.



Trevor Fletcher and his four-year-old daughter, Seonaid, use their Realistic Pro-34 scanner while watching planes land and take off from Edmonton Municipal Airport.

Trevor Fletcher from Edmonton, Alberta, writes in to say that he and his four-year-old daughter, Seonaid, like to visit the local airport every week and monitor with their Realistic Pro-34 handheld scanner. Trevor says his daughter insists on holding the scanner, and loves to listen to the noise that comes across from the tower and the aircraft. He says he hopes Seonaid continues her interest in the radio hobby as she grows up. Here are the frequencies the dad-and-daughter duo monitor while at the airport: 129.275, Stars air ambulance; 119.500, Edmonton Municipal Airport arrivals/ departures; 125.400, Edmonton Municipal Airport ATIS; 121.300, Edmonton Municipal Airport clearance; 121.900, Edmonton Municipal Airport ground control; 119.100, Edmonton Municipal Airport tower; 462.800, Edmonton Municipal Airport security; 134.700, and Edmonton International Airport ATC (interesting because planes from all over the world use this frequency while flying over Alberta).



Seonaid Fletcher uses Dad's binoculars to spot a passing plane, but note she also is holding Dad's Pro-34 scanner. Dad says she won't part with the radio during their weekly visit to the air field.

Kevin Lee Moore, of Warsaw, Kentucky, checks in to say that he's been a scanner hobbyist for 13 years now. He's a former volunteer fire, rescue, and life squad member. He owns Uniden Bearcat 855-XLT and 140XLT scanners. Kevin passes along some frequencies of interest for his area: 155.160, Gallatin County, Kentucky, fire and EMS dispatch; 154.415, Gallatin County fire F-2; 155.730, Gallatin County sheriff and Warsaw police; 453.150, Florence police; 453.700, Boone County police and sheriff; 154.190, Boone County fire dispatch; 155.865, Boone County fire and EMS dispatch; 154.430, Covington fire; 453.500 and 453.975, Covington police; 155.340, Stat Flight F-1; 155.400, Stat Flight F-2; 155.220, Sky Care;

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462.975, Air Care dispatch; 453.800, Kentucky State Reformatory; 453.675, Greater Cincinnati/Northern Kentucky Airport police; 453.925, Kentucky State Park police; 461.400, Delta Queen riverboat (note: I've only heard paging on this frequency in the past); and 464.850, Delta Queen riverboat.

John C. Dees, of Marion, Kentucky, writes that he likes to monitor railroad communications while mobile in western Kentucky and southern Illinois. He uses a Realistic Pro-39 scanner with a GRE Super Amplifier and a Realistic magnetic-mount all-band scanner antenna. John notes that most railroads seem to use 457.9375 for end-of-train devices. Here are some additional railroad frequencies he likes to monitor: Paducah & Louisville Railway—160.740, road; 160.695, yard; 161.325, yard; 161.290, PBX; 160.215, Paducah shops and materials department; 160.455, communications and signals department (digital data); 160.830, maintenance of way; 161.400, interchange operations at Louisville. Burlington Northern Railroad—161.100, road channel 1; 161.160, road channel 2; 160.665, PBX channel 3, Centralia, Ill., and Goreville, Ill.; 160.425, PBX channel 8, Sesser, Ill. CSX Transportation—161.370, road; 161.520, road; 160.980, Madisonville, Ky., PBX; 161.265, Madisonville, Ky., PBX; 160.785, engineering. Illinois Central Railroad—161.190, road; 160.920, road; 161.010, Fulton, Ky., yards; 161.460, Fulton, Ky., yards. Hardin Southern Railroad (Hardin, Ky.)—160.410, road; 161.445, road. Tradewater Railway—160.635. Southern Pacific Railroad, 161.550, road channel 1; 160.320, road channel 2; 160.800, Oak Ridge, Mo., PBX. Union Pacific Railroad—160.410, road channel 1; 160.470, road channel 2; 160.515, road channel 3, West Vienna, Ill.; 160.230, yard, Benton, Ill.; 160.605, maintenance of way PBX, Benton, Ill., Pinckneyville, Ill., Gorham, Ill.; 160.755, PBX, Gorham, Ill.

John also passes along these railroad-related frequencies of interest in his area: 153.425 and 451.025, AEPX Cook coal terminal, Metropolis, Ill.; 461.550, Track Tech (track maintenance company), Paducah, Ky.; 151.745, Rail Services (car repair shops), Calvert City, Ky.; 151.535, Vulcan Materials Co. (unit train unloading), Grand Rivers, Ky.

Ralph Kiner,of Boston, Massachusetts, sends along a news clipping detailing the new mobile data terminal that Boston police are employing. While only 100—or about a third—of Boston's patrol cars are equipped with the computer terminals now, all should be equipped by 1996. By then, Boston will be the first city in the nation to have its entire cruiser fleet on line. The mobile terminals are linked by radio to a central computer at Boston's City Hall. Ralph says that the patrol cars now sport two antennas, one for the mobile terminals and the other for the UHF two-way radios. At present, police can only access warrant and driver's license information, but the system should allow officers soon to access the National Crime Information Center. That will allow officers to conduct nationwide checks on suspects and vehicles in a matter of seconds—all in the comfort of their patrol cars.

Boston police also hope to use the mobile terminals to assist them in computer-aided dispatching. Officers will be able to receive their patrol assignments via computer, and learn the history of police calls to a certain address before they even arrive. It's all evident of how communications are becoming high-tech, leaving less voice traffic for scanner owners to receive. In the future, Boston police hope to be able to use the mobile terminals to scan a suspect's fingerprints and instantly match the set to any on file. It's cybercops to the rescue!

Maureen Pranghofer, of Golden Valley, Minnesota, says she bought her first scanner back in 1977. While she's interested in what's going on in her neighborhood, she also has found a practical use for her radio. Maureen is blind and uses a motorized wheelchair. She makes use of the paratransit system that operates in the Twin Cities to get around. While she considers the paratransit system in her area to be well developed, she says that it can be somewhat unreliable at times. According to Maureen, scheduled pickups can be on time, but sometimes they also run late. Though the paratransit people didn't know their frequency for their vehicles, Maureen searched, and found them using 858.6125. Now she regularly monitors the frequency before she leaves. By listening, she can learn who her driver will be, who she will be riding with, and how far out of her way she may be going so she can call her destination ahead of time and say she expects to be late. Maureen suggests other disabled persons who use paratransit service try tuning in to keep posted on their rides.

Also, Maureen has found that carrying a cellular phone has proven very helpful. She's used it on occasions such as when she is outside someone's door and needs it opened so she could enter. She's also found it handy when she has become stuck in a public restroom with a closed door or in an elevator with buttons out of reach.

Maureen adds that she enjoys *POP'-COMM* very much and is glad that it is available in braille. We're equally glad to pass along your tips, Maureen.

What are your favorite frequencies? Do you have any scanner-related questions? Do you have any listening tips worth passing along to your fellow readers? How about sending in a photo of your listening post or antenna farm? Write to: Chuck Gysi, N2DUP, Scanning VHF/UHF, Popular Communications, 76 N. Broadway, Hicksville, N.Y. 11801-2909, or Email to scan911@aol.com through the Internet.

Beaming In: *(from page 5)*

every 10 to 20 minutes. Nor did they squawk about certain words in their creations being bleeped by local stations or network censors, nor scenes being callously cut because they were objectionable or because the films needed to be force-fit into certain time slots.

How about that?

* * *

An anonymous reader wrote to mention that companies open only during normal business hours should be very careful about securing their offices at night, but often overlook one important thing. They close up the shop, but leave their radio repeater on all night.

Such unguarded repeaters, he claims, exist in business and industrial radio services, and in the VHF and UHF bands. Plentiful in congested metropolitan areas, they can be found elsewhere too. This arises when companies don't remember to shut off their repeaters at the end of the work day.

These unguarded repeaters just sit there all night, idle, but they're standing by. All it takes to access any of them is a signal on the input frequency and the correct CTCSS tone. It seems this has not gone unnoticed by at least some unauthorized people owning programmable transceivers. Their hobby is hacking into such repeaters. There they conduct networks, and have assorted fun and games while the repeater owners and local FCC personnel are asleep.

By the time business hours roll around, these clowns are history. The companies who so generously supplied the facilities of their wide area repeaters remain blissfully ignorant of everything.

Seems like as good a reason as any to shut off a temporarily unused business or other repeater. Wouldn't you agree?

* * *

I'm one of those people who gets yelled at by the people in my household when they try to use the landline any time I'm yakking on the air. Never saw anything like it. I come through the phone whether I'm on AM, SSB, FM, or CW. They've gotten annoyed, have put the whammy on my radios, and sometimes I think my soda has had a peculiar aftertaste.

Folks, I've put filters on these phones. There are so many filters on my radios that it's a wonder a signal gets through. Still, I come through the phones.

That's why I was so interested to learn that the FCC gets 25,000 complaints every year from people receiving interference to their phone conversations from nearby transmitters. The FCC believes this number represents only a fraction of the people with this same complaint.

The FCC's conducted a nationwide study of the problem, asking each of 35 local offices to investigate three recent complaints of this nature. This investigation required that information be gathered concerning the type and power of the transmitter causing the interference. FCC personnel then connected commercially available filters to the phones to see if they would eliminate the interference. In addition, the FCC checked out several telephone instruments claimed to be "interference free," that is, immune to interference.

The FCC's investigation came to the conclusion that most residential phones are susceptible to interference from nearby "transmitting stations." Of 241 phones tested, 68 percent received interference. The stations most likely to be involved were CB, broadcast, and ham. CB stations accounted for half the interference.

Transmitter power was not an important factor. One third of the stations were using less than 10 watts.

The FCC determined that commercial filters could not be relied upon to eliminate interference. In two out of three cases in which they were tried, they didn't work. Two "interference free" phones tested and found to be effective were the Western Electric/ATT Desk Model available from Pro Distributors of Lubbock, Texas, and the TPXL-D Desk Model from TCE Laboratories, Inc., of Canyon Lake, Texas.

This interference is not the fault of illegal transmitters, but takes place because most telephone equipment is unsuited to being used near any radio transmitters. FCC engineers feel that manufacturers can design phones that are immune to picking up interference from radio signals.

If you're one of the many communications people who tell me that they face this same problem, this information should be of some comfort. At least you know your station isn't out of whack, it's the phones that aren't making the grade.

Further information regarding the FCC's telephone interference study may be available from the FCC's Roy Kolly, at (202) 632-7090.

* * *

Starting with the October issue, all readers' RTTY loggings and information will be included in, and handled exclusively by, Don Schimmel's *Communications Confidential* column. From now on, RTTY, digital, and FAX monitors should send all oggings and other related correspondence to *Communications Confidential*, and watch for them there. A separate "RTTY" column will no longer appear. Our recent reader survey indicated that a single concise source of ute information would be the most convenient and effective way for *POP'COMM* to meet the needs of our versatile multi-mode monitoring readers.

On behalf of our columnists, here's a special "thanks" to those readers who are thoughtful enough to enclose a self-addressed stamped return envelope when writing and seeking a reply. This courtesy is greatly appreciated by your columnists!

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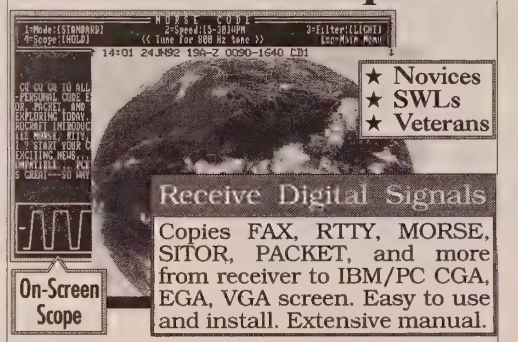

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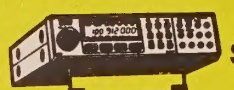

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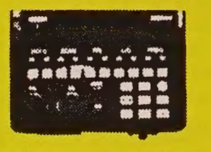
BC760 XLT covers the following frequencies: 29-54 MHz, 118-174 MHz, 406-512 MHz, 806-954 MHz (excludes cellular). Features compact size of 6-5/16"W x 1-5/8"H x 7-3/8", scan delay, priority, memory backup, channel lockout, bank scanning, key lock, AC/DC power cords, telescopic antenna, mounting bracket supplied, one year factory warranty, search, direct channel access, track tuning, service search including preprogrammed frequencies by pushing a single button for police, fire emergency, aircraft, weather, and marine services puts exclusive optional features never available on any scanner before. First is an RF receive amplifier for boosting weak signals for only $34.99 plus a CTCSS tone board is available for only $59.99 to make this the number one scanner available in the USA.

Optional cigarette lighter plug #760MPC . $4.99

UNIDEN MR 8100A



SPECIAL SALE PRICE ONLY **$289.99**

100 channel digital programmable mobile scanner, turbo scan up to 100 channels per second, lockout, priority, built-in automatic 2 second delay, dimmer control, back-lighted keyboard, track tuning, direct programming of frequencies from front keyboard plus you can also program MR8100 from your IBM compatible PC computer with software included with scanner from Scanner World. Frequency coverage: 29-54 MHz, 118-174 MHz, 406-512 MHz, 806-956 MHz. Dimensions: 7.8"W x 5.8"H x 1.9"D. Earphone jack, BNC antenna jack, DC power cord, mobile mounting bracket, internal memory backup, bank scanning, 10 bands of 190 channels in any combination.

MODEL: FB-911

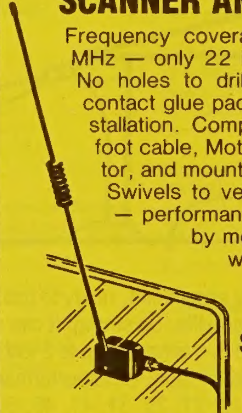
FIRE BOX PHONE

$45.99 *($5.50 Shipping Each)*

FIRE
FIRE
911

13 memory phone, 3 direct access emergency memories, auto redial, ringer on/off, top light flashes when telephone is ringing, tone/pulse switchable, desk/wall mount, front door closes for authentic fire box appearance. FCC approved. Size 16"H x 8½"W x 7"D.

GM-1A™ GLASS MOUNT SCANNER ANTENNA



Frequency coverage 25-1200 MHz — only 22 inches tall. — No holes to drill — includes contact glue pads for easy installation. Complete with 17 foot cable, Motorola connector, and mounting hardware. Swivels to vertical position — performance unaffected by moisture on the window. Made in USA.

SPECIAL

$39.99

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GLASS MOUNT ANTENNAS FOR TRANSCEIVERS

Includes mounting kit and cable. Low band, High band and UHF band include PL259 connectors. 800 cellular band antenna includes TNC connector.

GM-27	**27 MHz Low Band for CB**	**$39.99**	*($4.00)*
GM-155	**144-174 MHz High Band**	**$39.99**	*($4.00)*
GM-450	**450-470 MHz UHF Band**	**$39.99**	*($4.00)*
GM-800	**Cellular Telephone Band**	**$34.99**	*($4.00)*

ORDERING INFORMATION: Call (518) 436-9606 to place orders or mail orders to Scanner World, USA®, 10 New Scotland Ave., Albany, N.Y. 12208. Orders will be shipped within 24 hours by United Parcel Service if order is accompanied by MasterCard, Visa, cashier's check, money order, COD (COD shipped by United Parcel Service will be cash or money order only). (If a COD package is refused, customer will be billed for shipping and COD charges.) Mail orders with personal or business checks enclosed will be held 4 weeks for bank clearance. Prices, specifications, and terms subject to change without prior notice. If items are out of stock we will backorder and notify you of delivery date. All shipments are F.O.B. Scanner World® warehouse in Albany, N.Y. We are not responsible for typographical errors. All merchandise carries full manufacturer's warranty. Bid proposals and purchase orders accepted from government agencies only. Free full line catalog mailed 4 times per year. Merchandise delivered in New York State add your local sales tax. No returns accepted after 7 days of merchandise receipt. * Add ($) per item, and $4.00* for all accessories ordered at same time. COD orders will be charged an additional $4.95 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service to street address only. (No P.O. Box). Shipping charges are for the 48 continental US States only: Alaska, Hawaii and all others ask for quote on shipping charge.

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Total Coverage Radios

TR 980

5MHz to 1.3GHz 125 Channels

New! An economical total coverage hand held scanner. Five scan banks, five search banks. Scan lockout and search. AM/Narrow FM plus wide band FM. Priority, hold, delay and selectable search increments. Permanent memory. Ni-cad pack and wall charger included with belt clip, cast and antenna.

Size: 5 7/8 x 1 1/2 x 2.
Wt. 14 oz.

Fax fact document # 150 **$299.00**

TR 1000XLT

AM Broadcast to Microwave
1000 Channels

500KHz to 1300MHz coverage in a programmable hand held. Ten scan banks, ten search banks. Lockout on search and scan. AM plus narrow and broadcast FM. Priority, hold, delay and selectable search increment of 5 to 995 KHz. Permanent memory. 4 AA ni-cads and wall plus cig charger included along with belt clip, case, ant. & earphone.

Size: 6 7/8 x 1 3/4 x 2 1/2.
Wt. 12 oz.

Fax fact document # 205 **$389.00**

TR 2500

2016 Channels

1 to 1300MHz

Patented Computer Control

62 Scan Banks, 16 Search Banks, 35 Channels per second. Patented Computer control for logging and spectrum display. AM, NFM, WFM, & BFO for CW/SSB. Priority bank, delay/hold and selectable search increments. Permanent memory. DC or AC with adaptors. Mtng Brkt & Antenna included.

Size: 2 1/4H x 5 5/8W x 6 1/2D.
Wt. 1lb.

Fax fact #305 **$449.00**

TR 1500

Full Coverage with SSB and 1000 Channels.

500KHz to 1300MHz. Ten scan banks, ten search banks. Search lock and store. BFO. 2 Antennas. AM/NFM/WFM. Selectable increments . Tons of features,

small size: 5 7/8 x 1 1/2 x 2.
Wt. 14 oz.

Fax fact document # 250 **$449.00**

Continuous Coverage

New Bearcat mobile/desktop offer continuous coverage of VHF/UHF/800 bands!. The Bearcat 890XLTB covers 29-956MHz with 200 channels, Turbo scan, WX search, VFO tuning, 10 priority channels and more! The Bearcat 8500XLTC covers 25-1300MHz in AM/NFM/WFM modes with 500 channels, turbo scan, 10 priorities, VFO tuning, and more. Fax fact documents 477 & 475.

Bearcat 2500XLTA	**$349.00**
Bearcat 8500XLTC	**$379.00**
Bearcat 890XLTB	**$259.00**

Mobile Scanners

Bearcat 760XLTM **$229.95**

100 Channel 800 MHz

Five banks of 20 channels each. Covers 29-54, 118-174, 406-512 and 806-954MHz (with cell lock). Features scan, search, delay, priority, CTCSS option, lockout, service search, & keylock. Includes AC/DC cords, mounting bracket, BNC antenna. Size: 4 3/8 x 6 15/16 x 1 5/8. Weight: 4.5lbs. Fax fact document #550

Other Mobile Scanners

BC560XLTZ **$99.95**

Fax fact on above: #560

(color slide)

Trident TR-2 .... **$49.95**

Scan/CB/Highway Patrol/ plus extra cost WX. X,K,Ka,Wide & Laser

Scans police pre-programmed by state channel plus full radar and laser alerts in one small unit. Weather, CB receive & mobile relay. Size: 5 5/8 x 4 7/8 x 1 3/4. Wt: 1.5lbs. Fax fact #580

Other pre-programmed scanning receivers

BC350AS	**$129.00**
BCT2	**$149.00**
BC700AS	**$169.00**

Fax fact on all above: #580

Hand Held Scanners

Bearcat 200XLTN **$209.95**

200 Channels 800 MHz

Ten scan banks plus search. Covers 29-54, 118-174, 406-512 and 806 956MHz (with cell lock). Features scan, search, delay, 10 priorities, mem backup, lockout, WX search, & keylock. Includes NiCad & Chrgr. Size: 1 3/8 x 2 11/16 x 7 1/2. Wt. 32 oz. Fax Facts # 450

Other hand held scanners

Bearcat 70XLTP 20Ch H/L/U	**$139.95**
Bearcat 55XLTR 10 Ch H/L/U	**$99.95**

Fax facts on all above: #475

Table Top Scanners

Bearcat 855XLTE 50Ch w/800	**$159.95**
Bearcat 142XLM 10Ch H/L/U	**$84.95**
Bearcat 147XLJ 16 Ch H/L/U	**$89.95**
Bearcat 172XM 20Ch H/L/U/Air	**$124.95**
Bearcat 210 16Ch H/L/U/Air	**$129.95**

Fax facts on all above: #675

Shortwave Receivers

ATS-818CS **$224.95**

16 Band digital receiver with programmable cassette recorder, BFO for SSB, AM/FM Stereo, 45 preset memories LCD display with dual time. Signal & Btt. strength indicator. Sleep timer & tone control.
Fast Fax #505

ATS-818 .... **$194.95**

Same as 818CS but w/o cassette.
Fax Fact #506

ATS-803A **$174.95**

The perennial best buy receiver. 16 band digital receiver with AM/FM/FM Stereo modes. 9 memory presets. Auto/Manual and Scan modes. BFO RF Gain and Dual Filter controls. Complete with adaptors and headphones.
Fax Fact #507

ATS-808 .... **$184.95**

Compact size, great performance in a 16 band digital receiver. AM/FM/Stereo with 45 memory presets. LCD display with dual time clock. Complete with adaptors and head phones.
Fax fact #508

(photo)

ATS-606 .... **$154.95**

16 band ultra compact digital receiver with auto tuning and scan system. 45 memory presets cover AM/FM/Stereo. Dual time display, alarm timer, adjustable sleep timer.
Fax Fact #509.

SG-621 .... **$79.95**

Compact 10 band receiver with AM/FM/Stereo. Analog tuning with a digital display.
Fax Fact #513.

ATS-800 .... **$94.95**

13 band digital receiver with AM/FM/Stereo and 20 memory presets. Auto/Manual, scan clock and sleep timer.
Fax fact #510.

SG-631 .... **$99.95**

10 band analog tuning with digital display which shows time and day for 260 cities throughout the world.
Fax fact #511.

SG-789 .... **$54.95**

10 band analog tuning super compact and very economical.
Fax fact #512.

SG-700L **$49.95**

12 band AM/FM compact portable analog receiver
Fax Fact #514

TOTAL COVERAGE RECEIVERS

TR 980
TR 1000XLT
TR 1500

SCANNERS

SHORTWAVE RECEIVERS

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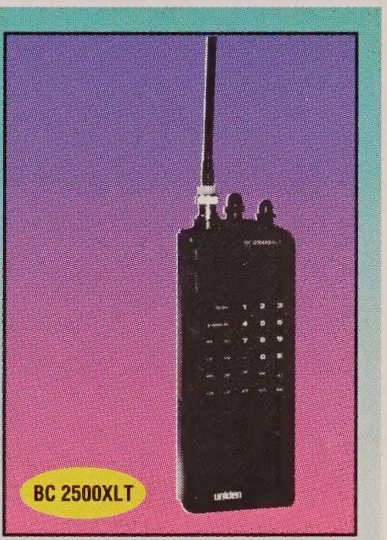

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IC-820H FEATURES:

- ☐ Built-in Auto Satellite Functions
- ☐ All Modes in a Compact Case (9.5" W x 2.7" H x 10.0" D)
- ☐ "Plug and Play" 9600 bps Operations
- ☐ Built-in High Stability Crystal (± 3 ppm)
- ☐ Independent Controls with Sub Tuning
- ☐ New DDS for 1 Hz Resolution
- ☐ IF Shift (electronically shifts for effective interference reduction)
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- ☐ Doppler Compensation Function
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- ☐ New Modulation Limiter Circuit
- ☐ 2 VFO's each for VHF and UHF Bands
- ☐ 50 Memory Channels
- ☐ Stereo Headphone Jacks
- ☐ 2 Antenna Connectors
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- ☐ RIT Function
- ☐ Memory Allocation Function
- ☐ Attenuator
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- ☐ AF Speech Compressor (audio)
- ☐ Auto Repeater and One-Touch Functions
- ☐ Separate Main and CW Filters
- ☐ CW Narrow Filter (optional)
- ☐ Tone Scan (optional)
- ☐ 45 W (FM, CW), 35/6 W (SSB) VHF
- ☐ 40 W (FM, CW), 30/6 W (SSB) UHF

IC-820H 2 M/440 MHZ Dual Band All Mode Transceiver

The IC-820H isn't your typical base station transceiver. This all mode dual bander has compact and lightweight dimensions offering operating versatility other base stations just can't match. Mobile and field operations are ideal with this rig. But don't let its size fool you. This is a high performance transceiver with state-of-the-art construction, circuit design and cutting edge features.

ICOM's **Newly Designed I-loop DDS** (digital direct synthesizer) is employed in the PLL circuit of the IC-820H. Previous PLL circuits for 10 Hz resolution transceivers contained 2-loop circuits. The new I-loop has a single loop and **Generates a Signal with Superior 1 Hz Resolution**. ICOM's DDS PLL also contains a normal PLL as the main-loop and a DDS as the sub-loop.

Satellite operation with the IC-820H's **Built-In Satellite Functions** has never been this easy. These include **Normal and Reverse Tracking** for different modes of satellite communications; **Independent Uplink/Downlink Control** for Doppler shift compensation; **Separate Satellite VFO** and **10 Dedicated Satellite Memories** provide quick switching from normal to satellite operation as well as easy recall of satellite and downlink frequencies.

With **Independent Controls and Indications for Both Bands**, this dual bander is as easy to operate as most single band transceivers – and exchanging the main and sub bands is just a switch away. In addition, while simultaneously receiving signals on each band, **Separate S-Meters** indicate their respective signal strengths.

The **Sub Tuning Function** can be assigned to the **RIT** or **SHIFT** control and allows you to tune automatically at variable tuning speeds. This is especially useful when searching for signals over a wide frequency range – eliminating the need for excessive rotations of the main dial.

The IC-820H's **Compact Size** enables easy installation in a shack as well as a vehicle. Overall dimensions may be small, but important points such as LCD size and space between switches are more than adequate.

An important consideration in all mode transceivers is the interference reduction circuit. The IC-820H's **IF Shift Circuit** shifts the center frequency of the receiver passband electronically to evade interfering signals.

The IC-820H's **DATA Terminal** (in ACC socket) is connected to its modulator circuit directly. This **Data Jack supports Packet Operation** at up to **9600 bps** A newly designed **Modulation Limiter Circuit** is employed in the modulator circuit to prevent you from exceeding the maximum deviation – even with large amounts of data.

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